

TOSHIBA

STEREO CASSETTE DECK

PC-D12



SPECIFICATIONS

| | | | |
|---|--|---------------------------|--|
| Heads: | Record/playback head: Super AP (super-hard permalloy) head x 1 Erase head: AF (2 gap ferrite) head x 1 | Input Level: | MIC: 0.25mV (600 ohm – 10 k ohm) LINE: 70 mV (50 k ohm) |
| Tape Transport: Motor: | Dual motor IC logic control Capstan drive: DC servo motor x 1 Reel drive: DC motor x 1 | Output Level: | LINE: 0.4V (50 k ohm) PHONES: 0.14mW (8 ohm) |
| Wow & Flutter: | 0.04% WTD, RMS ±0.15% (DIN) | Semiconductors: | ICs: 11 Transistors: 43 FETs: 4 Diodes: 47 LEDs: 25 |
| Rewind/fast forward Time: | Approximately 80 seconds (C-60) | Power Supply: | AC 240V 50 Hz for Europe AC 240V 50 Hz for United Kingdom & Australia AC 115V/230V 50 Hz/60 Hz for Southeast Asia, South America and Middle East AC 120V 60Hz for U.S.A. and Canada |
| Frequency Response: | 25 Hz – 18,000 Hz for metal tapes 25 Hz – 17,000 for chrome type tapes 25 Hz – 16,000 for normal tapes | Power Consumption: | 22W |
| Signal-to-noise Ratio: | 60 dB (Line in, Peak level, WTD) | Dimensions: | 257(W) x 106(H) x 214(D) mm (including knobs and feet) |
| Dolby NR Effect: | 5 dB improvement at 1 KHz 10 dB improvement above 5 kHz | Weight: | 3.8 kg |
| Distortion: | 0.7% (0 dB, 400 Hz) | Accessories: | Audio cables x 2 Dustcover Head cleaner |

Specification are subject to change without notice

TA, TC, TE, TU, AY, VF

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*Noise Reduction System is manufactured under license from Dolby Laboratories.

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1. FEATURES

- Silent mechanism with two-motor IC logic controls:
Light-touch, tape transport control buttons have integral LED indicators (except the STOP button).
The dual-motor system has a DC servo motor for capstan drive and a DC motor for reel drive to ensure reliable, simple and silent operation.
- LED peak level meters:
Unlike electromechanical meters, LED level meters have no moving parts, and respond quickly and accurately to every peak in the input signals. Red LEDs indicate signals above 0 dB, and green LEDs indicate signals below 0 dB.
- Memory counter feature:
Auto stop, auto play, auto rewind, and counter repeat are provided as standard. Other features include unattended recording, alarm playback, and so forth.
- Four-position tape selector includes METAL position.
- METAL tape capability and super AP heads—the hyperbolic head surface assures stable tape contact for all tape types giving excellent recording/playback performance.
- Direct loading system—gives maximum tape visibility and easier tape loading/unloading.
- Dolby NR system with MPX ON/OFF feature.
- Remote control with optional remote control unit.

2. OPERATING CONTROLS

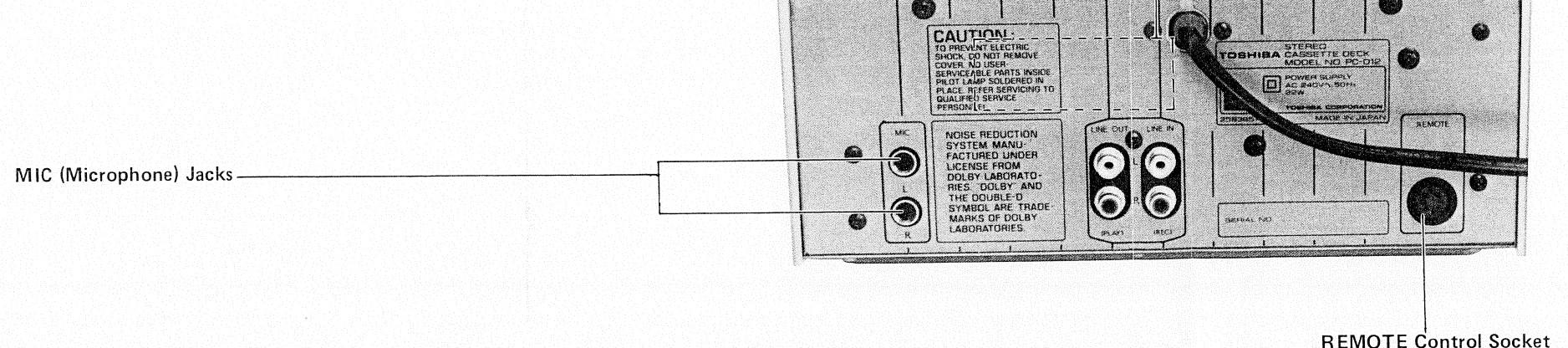
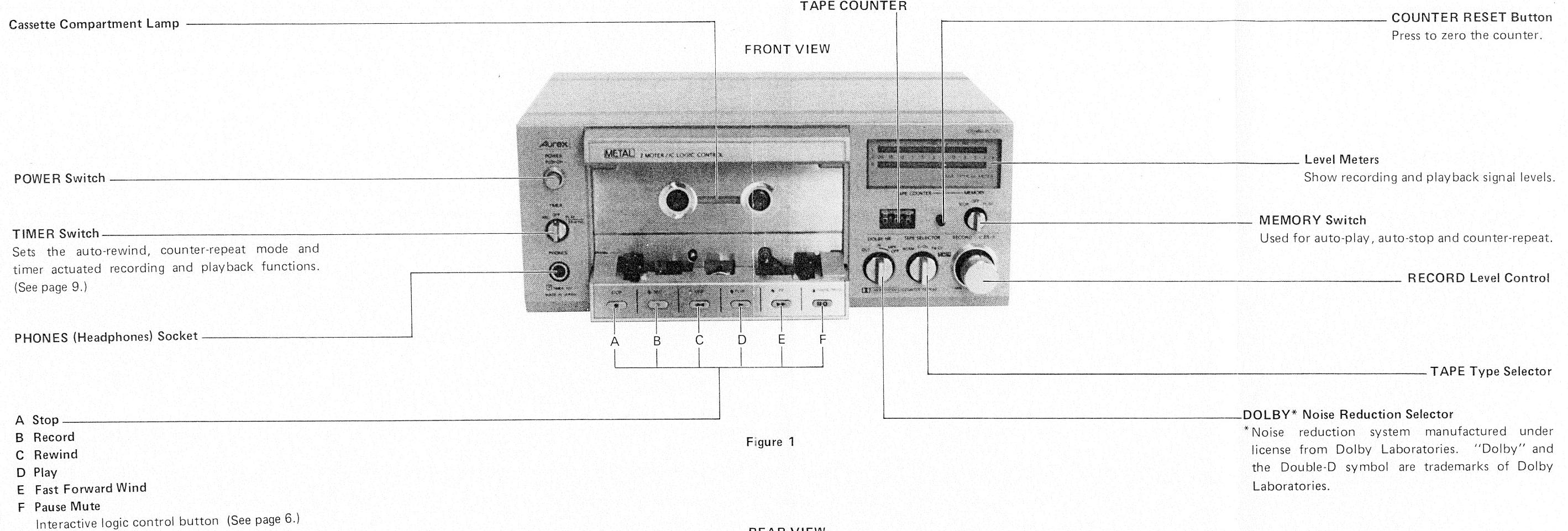


Figure 2

NOTE: Ordinary unit has been already set to the "230V" position.

Figure 3

3. OPERATING INSTRUCTIONS

Setting up your PC-D12

<Rear Panel PC-D12>

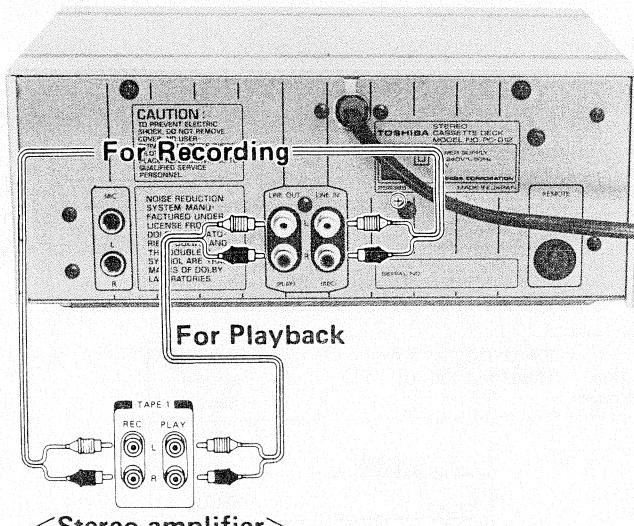


Figure 4

- ① Disconnect all power from your hi-fi system by removing the plugs from the AC outlets. (Be sure to pull the plug itself, never the cable.)
- ② Connection to a Stereo Amplifier or Stereo Radio Receiver.
- Plug either of the supplied audio leads into the REC sockets on the back of the cassettes deck, and plug the other end of this lead into the REC or LINE IN sockets on your amplifier (or radio receiver)—use red plugs for the right channel.
- Plug the other audio lead into the PLAY sockets on the back of the cassette deck, and plug the other end of this lead into the PLAY or LINE OUT sockets on your amplifier—red for the right channel.
- Insert all the plugs fully to prevent noise.
- If your amplifier has different type sockets, consult your dealer and your amplifier instruction manual. The Remote Control RM-15S (optional accessory) should be plugged into the remote control socket.
- ③ Insert the AC power plug.
- ④ Press the POWER switch on the front panel. The meters and cassette compartment lamp will light.

Connections for Tape Copying Direct from Another Tape Deck

If you are not using a stereo amplifier that has a tape copying or dubbing switch and you want to make tape copies direct from another tape deck, connect the two decks with one cable as shown below. The diagram shows playback on the PC-D12. To record on the PC-D12, reverse the connections.

- Use red plugs for the right channel. Insert the plugs fully.

Note: If hum noise generates, try to relocate the deck.

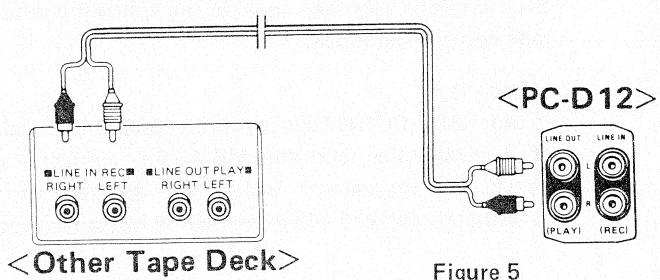


Figure 5

Cassette tapes

- The PC-D12 can record and play back cassette tapes with METAL, Chrome type, Normal (ferric) or Fe-Cr coatings. Select a tape type suited to your recording application, whether conversation, classical music, popular music, and so on.

Cassette Loading

1. Before loading a cassette, always take up any tape slack with your fingernail or a pencil to prevent the tape from entangling around the capstan.
2. Insert the cassette with the side you wish to record or play facing you, and the tape facing down,

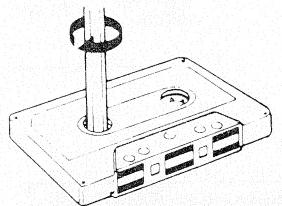


Figure 6

Erasure Prevention Tabs

This deck has an erasure safety device. To prevent accidental erasure of a recorded tape, remove the tab as illustrated. To enable recording of a tape after removal of these tabs, cover the holes with adhesive tape.

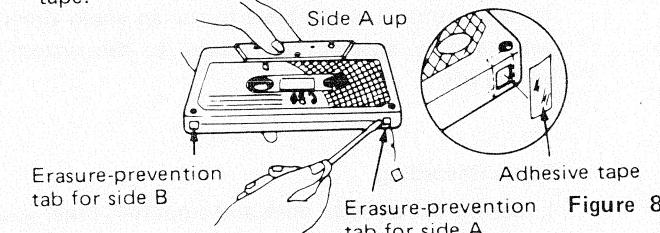


Figure 7

Figure 8

Recording

From Radio, Disc, Another Tape Unit, or TV
(Numbers refer to the steps below)

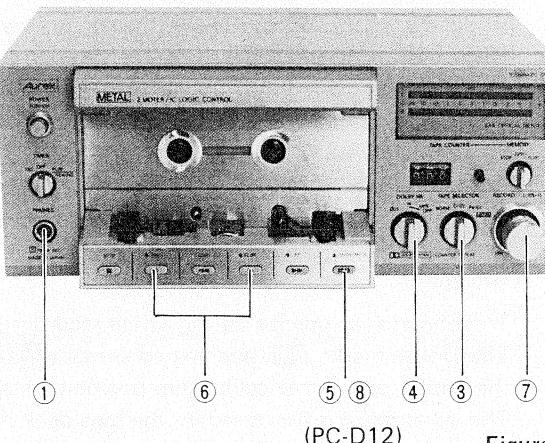
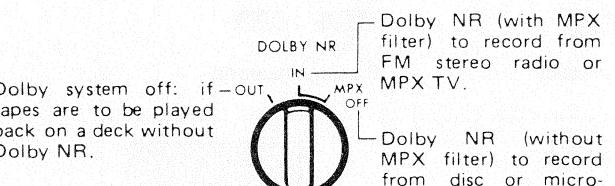


Figure 9

- ① Set the TIMER switch to OFF.
- ② Insert a cassette—with tab for the side you will record.
- ③ Set the TAPE selector to the tape type used: NORM, CrO₂, METAL or Fe-Cr.
- ④ Set the Dolby NR selector.

- Dolby NR recording have reduced tape-hiss on playback.



- ⑤ Press the PAUSE/MUTE button to enter PAUSE mode.
- ⑥ Press the REC and PLAY buttons simultaneously.
- ⑦ Set the RECORD level control so that the peaks of the programme signal light the peak level meters as shown below.
- ⑧ Press the PC-D12 PAUSE/MUTE button momentarily. Recording will start.
- ⑨ To stop recording, press either the PAUSE/MUTE, button momentarily, or the STOP button. Alternatively, the REW button can be pressed immediately to rewind the tape ready for playback.

Microphone Recording

For microphone recording, follow the recording steps given on the left after plugging the microphone(s) into the MIC jacks.

Fade-up Start

A professional-sounding fade-up start can be easily achieved. Note the exact position of the RECORD level control in step ⑦ and set the RECORD level control to zero. Just after pressing the PAUSE/MUTE button in step ⑧, smoothly turn the RECORD level control up to the correct position.

- The Auto Shut Off (ASO) feature automatically disengages the tape transport when the end of the tape is reached in any transport mode (play, rewind, etc.).

Note:

- The tape transport controls become operable a few seconds after power is switched on.
- When the unit is turned off, if enters stop mode, irrespective of its current mode.
- If there is no cassette loaded, all the tape transport controls will remain inoperative.
- To load or remove a tape, first press the upper part of the cassette against the top of the cassette compartment.

Setting the Recording Level

The correct recording level depends considerably on the type of tape used and the program material being recorded. The correct tape type and recording level should be selected to give the best frequency response yet lowest noise level.

For the following three tape types, the RECORD level control should be set so that the peak level meters light at the loudest passage of that programme selection:

| Tape type | Peak level meters |
|----------------------|-------------------|
| NORMAL (ferric) tape | -6 dB or 0 dB |
| CHROME type tape | -3 dB or +3 dB |
| METAL alloy tape | 0 dB or +5 dB |

The high-frequency response, in particular, depends considerably on the type of tape and the recording level. Metal-alloy tape, for instance, provides better high-frequency response than normal tape, thus giving much better reproduction of higher pitched instruments and voices. This is illustrated in Fig. 10.

For the same tape type, at lower recording levels, there is better higher-frequency response as shown in Fig. 11. So, to record programme material which contains considerable high-frequency sound, set the recording level somewhat lower. The level meter on this deck is an electronic "digital" indicator, which displays the peaks of the signal, in red over 0 dB and in green below.

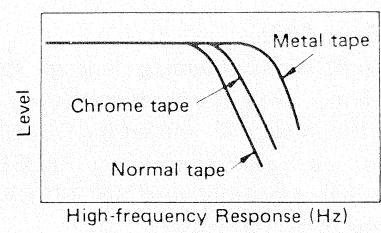


Figure 10

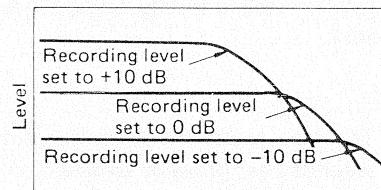


Figure 11

The PAUSE/MUTE button therefore serves a dual purpose: record mute and pause. For proper operation follow the steps given in the table just below. This is illustrated below.

| | ① Making a non-recorded gap | ② Releasing the pause mode |
|--------------------------------|---|--|
| PAUSE/MUTE button operations | <p>A non-recorded gap can be created by pressing and holding the PAUSE/MUTE button during recording. When the button is released, the tape stops in the pause mode.</p> <p>Press Release</p> | <p>To restart recording momentarily press the button again.</p> <p>Press momentarily</p> |
| Tape transport and record mode | <p>Record mute starts. Non-recorded space Tape transport stops.</p> | <p>Recording starts again</p> |

● When the button is pressed during playback, only the pause function operates. The PAUSE/MUTE button is not effective in the fast-forward and rewind modes.

Figure 12

Playback

Normal Playback

(Numbers refer to the steps below)

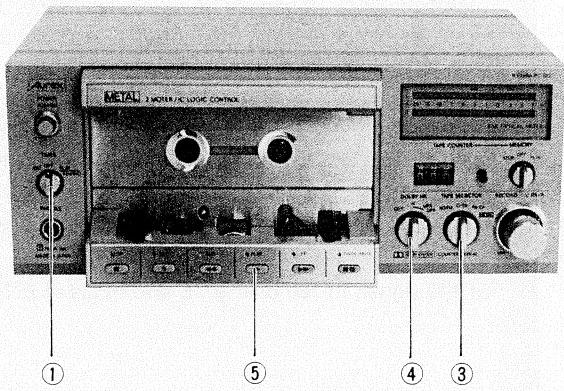


Figure 13

Mute Recording

After recording a piece of music, you may want to create a short silent space before further recording. The advanced-logic MUTE feature of this deck allows you to do this easily and professionally.

At the end of a recording, tape transport is normally stopped by pressing the STOP button or the PAUSE/MUTE button momentarily. If, however, the PAUSE/MUTE button is pressed and held in during recording, the tape continues to run but will be erased. When the button is released, the tape will stop in record standby mode ready to continue recording. To start recording again press the PAUSE/MUTE button a second time; when the PAUSE/MUTE button is released, recording will start.

This allows very precise setting of the recording level. The Dolby mark **DOLBY** and the adres mark **AD** indicate the Dolby and adres calibration positions, respectively. The adres mark is for use when the tape deck is connected to an adres unit. The adres system is Toshiba's new noise reduction and dynamic range expansion system.

Automatic Tape Control

The MEMORY switch, TIMER switch and TAPE COUNTER functions together provide the following automatic tape control functions.

[Auto Play]

If the TAPE COUNTER is reset to 000 at the beginning of a programme and the MEMORY switch is set to PLAY, the programme will be automatically rewound to 999 and replayed when the rewind button is pressed.

[Auto Rewind]

If the TIMER switch is set to PLAY/REW, the tape will automatically rewind to the beginning when the end of the tape is reached in the play or record modes. The MEMORY switch must be set to OFF to enable this TIMER function.

[Counter Repeat]

If the MEMORY switch is set to PLAY and the TIMER switch is set to PLAY/REW, the tape will replay repeatedly between tape location 999 and the end of the tape. If the TAPE COUNTER is reset to 000 at the head of a cassette tape, the entire side of the tape will be repeatedly replayed.

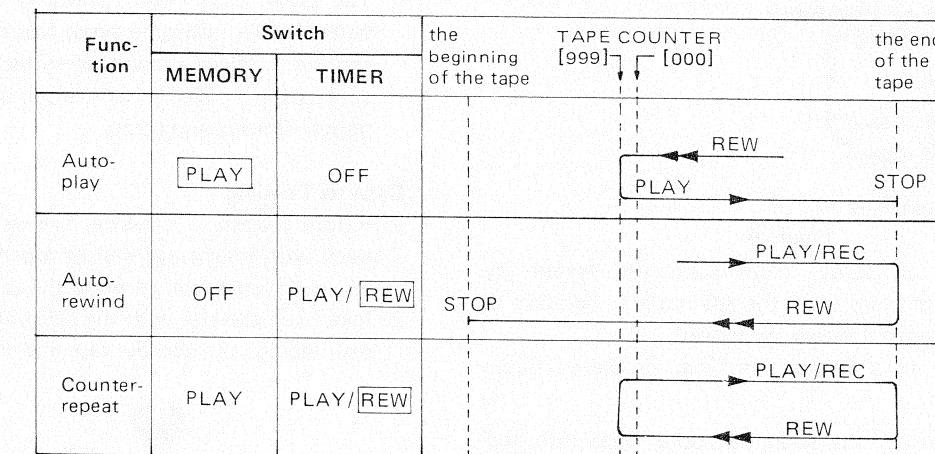


Figure 14

Timer Recording/Playback

When the end of a tape is reached during unattended recording or playback, the tape stops and the tape transport is automatically disengaged. However, the power to the deck and your stereo system will remain on, causing unnecessary power consumption and possible danger.

To avoid this, it is advisable to use an audio timer that automatically switches the power to the system both on and off.

Timer Recording

- Set the TIMER switch to OFF.
- Insert the cassette with the play side facing you.
- Set the TAPE selector for the tape type NORM, CrO₂, METAL or Fe-Cr.
- Set the Dolby NR switch to IN for tapes recorded with Dolby NR OUT for other tapes.

Note: The IN and MPX OFF positions give the same operation in play back.

- Press the PLAY button to start playback.
- To go from playback to another mode, the PAUSE/MUTE, REW, FF or STOP buttons may be pressed directly.
- At the end of the tape, playback will automatically stop.

When the time preset on the audio timer is reached, the audio system power will be turned on, and automatic recording will start.

Note: Set the TIMER switch to OFF when automatic recording has been completed. If the TIMER switch is accidentally left in the REC position, a portion of a recorded tape may be unintentionally erased when the power is switched on.

Timer Playback

(for morning alarm, etc.)

- Play the tape to be used for the morning alarm and adjust the amplifier volume control to a suitable volume level.
- Set the audio timer to the desired alarm time, and also set it to switch off the power to the system.
- Set the tape deck TIMER switch to the PLAY position.

When the preset alarm time is reached, the tape deck will automatically start playback.

4. TECHNICAL POINTS

Solenoid drive circuit

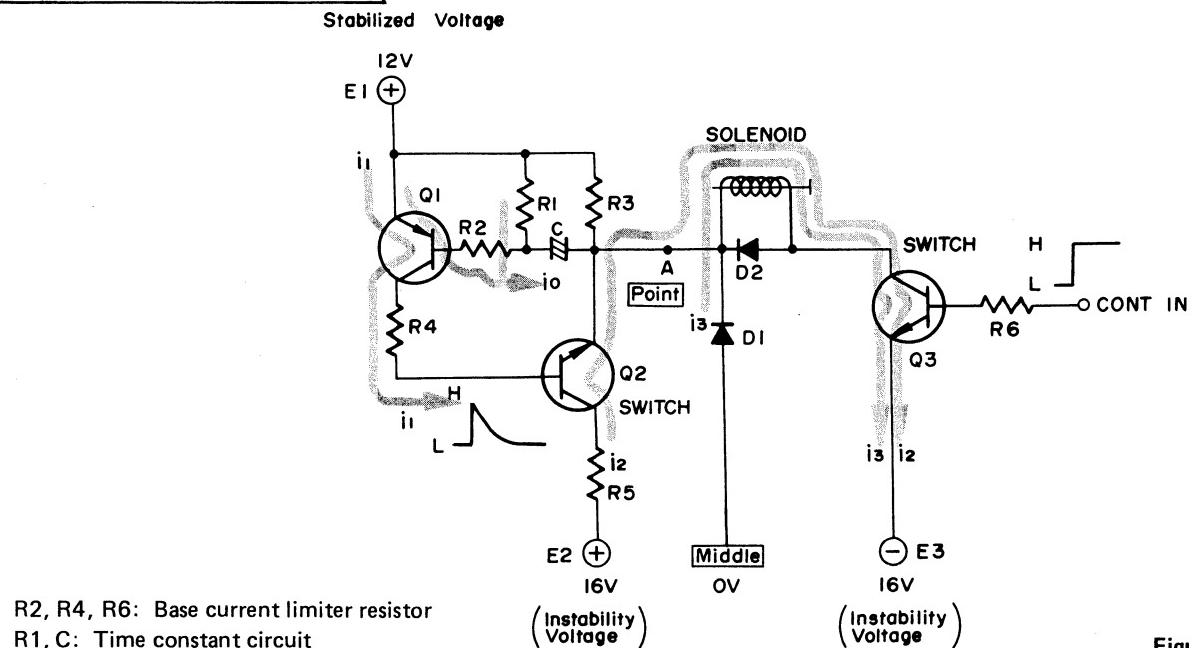


Figure 15

- ① When an input of H-level enters into the CONT IN, the switch transistor Q3 turns on and the voltage at the point A, + 12V up to that time, lowers.
- ② When the voltage at the point A has lowered, the charging current i_0 flows in C through R1 and R2.
- ③ When the current i_0 flows in C, the switch Q1 turns on to let the current i_1 flow, and the switch Q2 turns on.
- ④ When the switch Q2 has turned on, the current i_2 flows and the voltage at the point A becomes positive.
- ⑤ After a certain time has elapsed, the charging current in C lowers to minimum and the current i_1 lowers also to zero. Then, the switch Q2 turns off.
- ⑥ When the switch Q2 has turned off, the current flowing in the solenoid lowers gradually to i_3 .

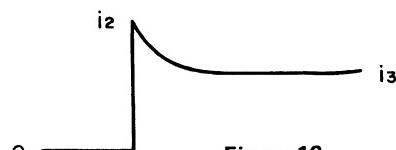


Figure 16

- ⑦ Voltage applied to the solenoid

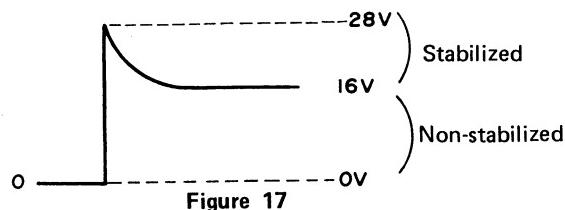


Figure 17

The voltage applied immediately after the switch turns on is half stabilized to suppress voltage fluctuation at the start time.

Purpose of this circuit

In a logic control tape deck, a solenoid is used to operate a head and pinchroller in the PLAY and REC modes.

The characteristic of a solenoid needs a large current for absorption, but does't need a large holding current after absorption.

The solenoid drive circuit stabilizes the voltage applied at the start time, and prevents lowering of the operating force when the voltage lowers.

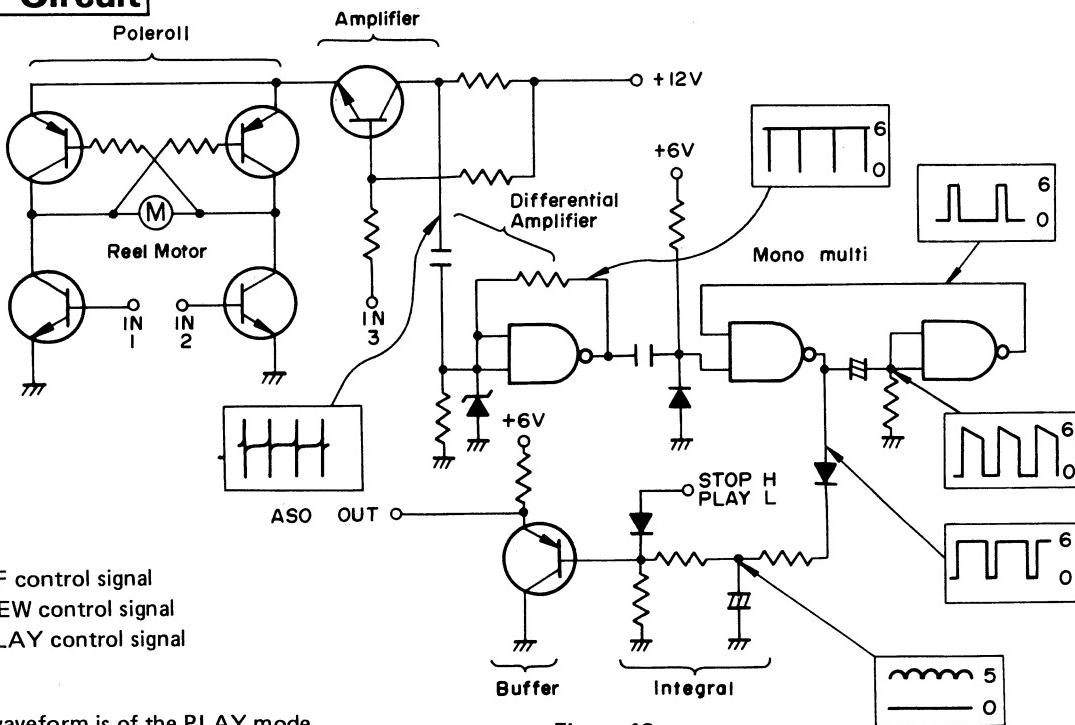
ASO Circuit

Figure 18

(Operation)

1. Amplify the commutator noise of the reel motor, and differentiate and amplify it to operate the mono-multi.
2. Integrate the above signal, and maintain the H-level during tape running.
3. When the tape has come to the end and the reel motor has stopped, the motor noise lowers to zero and the mono-multi becomes to the L-level. Then the integrated voltage lowers gradually to zero. Set the ASO OUT to the L-level through the buffer.
4. When the ASO OUT connected to the Z-input of the logic IC lowers to the L-level, the control circuit turns off.

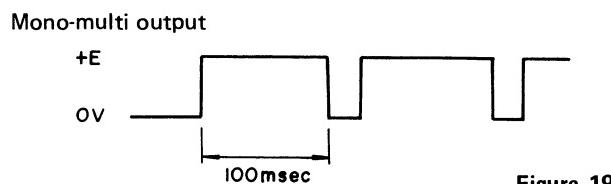
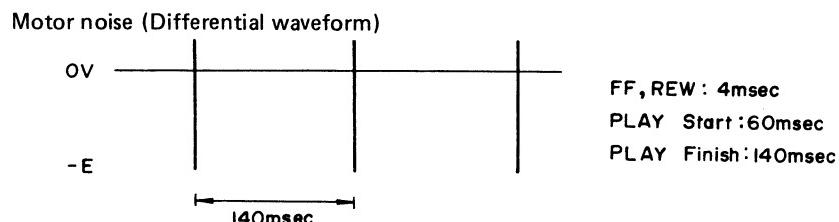


Figure 19

The mono-multi cycle is set almost the same as the maximum motor noise cycle value so that the duty ratio does not exceed 1:1;

Purpose of this circuit

The ASO circuit which detects the reel motor rotation by the rotation of the counter driven with a belt from the reel platform, is changed the detection method: detecting the reel motor rotation directly. Since this method does not require a rotation detecting element, the number of lead wires connected to the mechanism can be decreased.

5. DISASSEMBLY INSTRUCTIONS

FRONT PANEL REMOVAL

1. Remove two screws (1) ($2.6\phi \times 6mm$), then Key Box Assembly can be removed from the unit.
When replacing, set it at the end.
2. Remove two select knobs (2) as shown in Figure 20.
3. Remove two screws (3) ($3\phi \times 6mm$) holding bottom plate and panel from back side and two screws (4) ($3\phi \times 6mm$) holding jack plate and panel from back side as shown in Figure 20 and 21.

SIDE PANEL REMOVAL

1. Remove front panel.
2. Remove four screws (5) ($2.6\phi \times 6mm$) holding side plate and mounting bracket, then plate can be removed out to check both sides of P.C. Board easily.

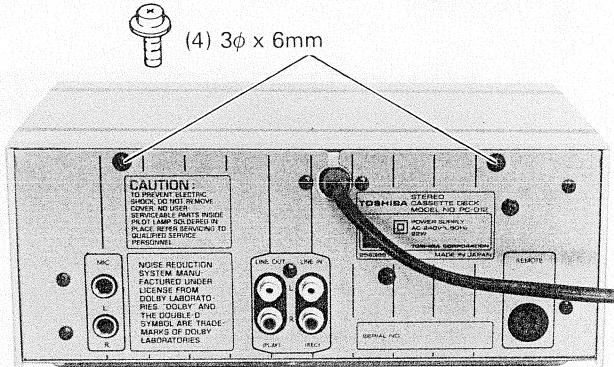


Figure 21

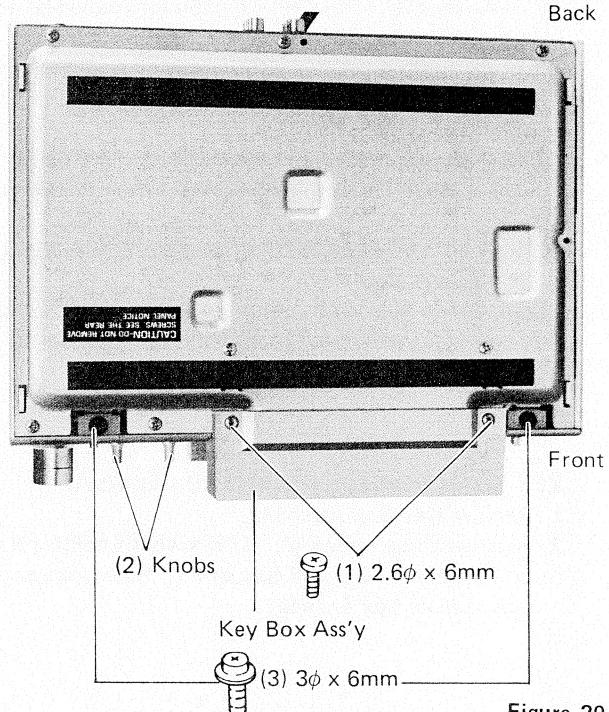


Figure 20

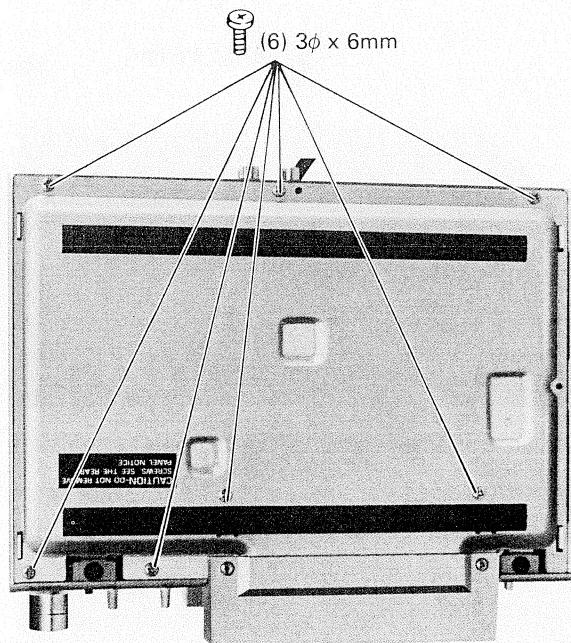


Figure 23

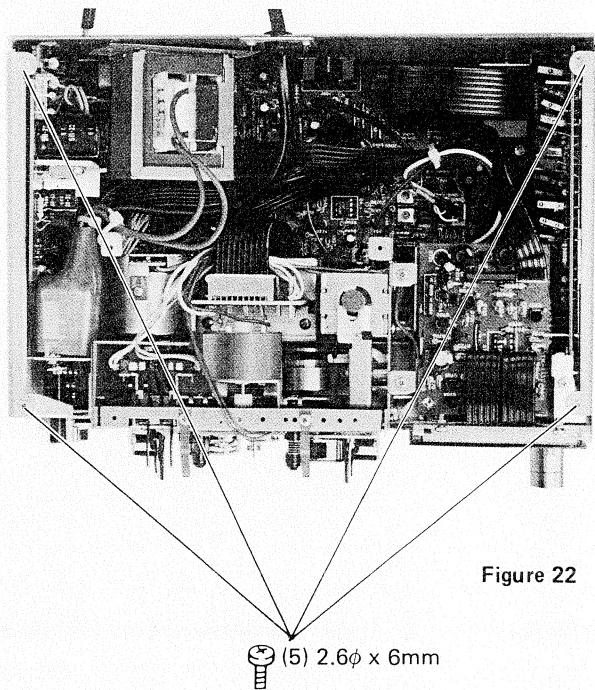


Figure 22

BOTTOM PLATE REMOVAL

1. Remove front panel.
2. Remove side plate.
3. Remove seven screws (6) ($3\phi \times 6mm$) holding bottom plate as shown in Figure 23.
4. After pushing power switch to position, remove two screws (7) ($3\phi \times 6mm$) holding mounting bracket as shown in Figure 24.
5. Remove two screws (8) ($3\phi \times 6mm$) holding Mechanism Assembly and bottom plate as shown in Figure 25.
6. Slide bottom plate forwards so that Main P.C. Board can be checked easily.

Caution: Mechanism Assembly should be carefully handled for it is holding all P.C. Boards.

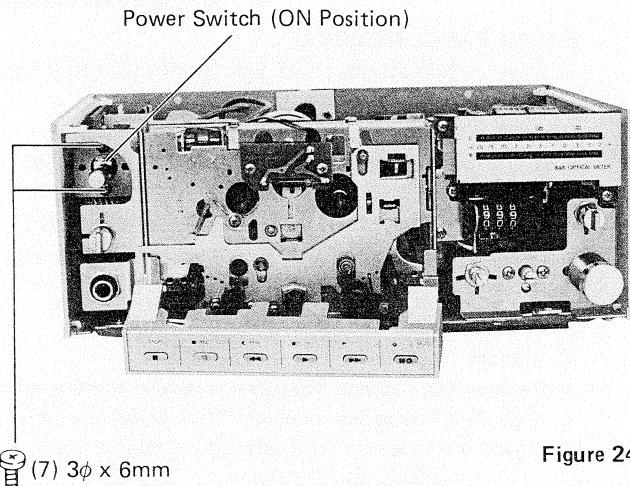


Figure 24

KEY BOARD SWITCH P.C. BOARD REMOVAL

1. Remove Key Box Assembly.
2. Remove three screws (9) ($1.7\phi \times 4mm$) holding P.C. Board, then Key Board Switch P.C. Board can be removed from box assembly.

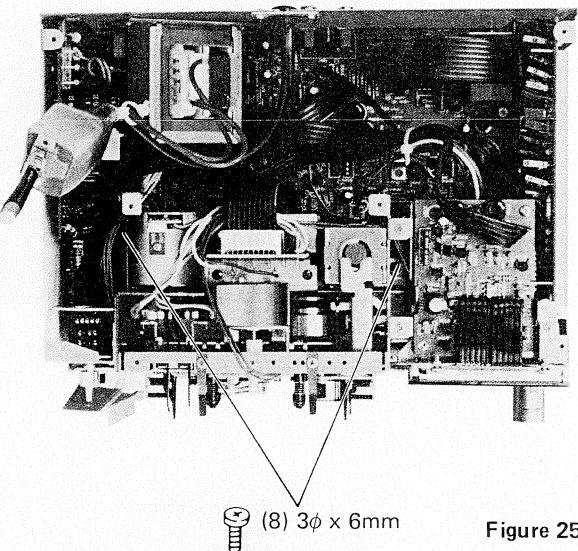


Figure 25

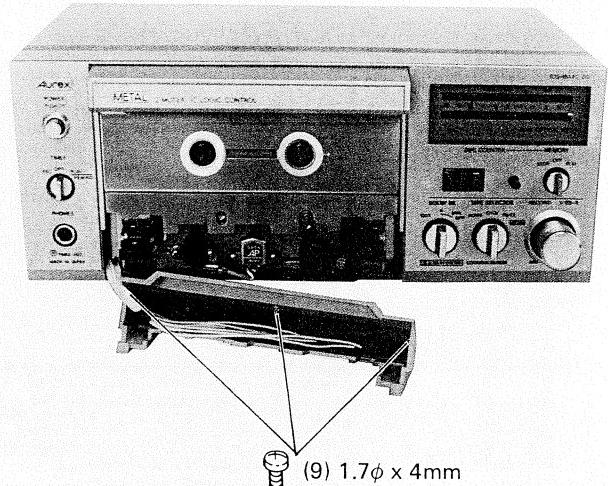


Figure 26

6. BLOCK DIAGRAM

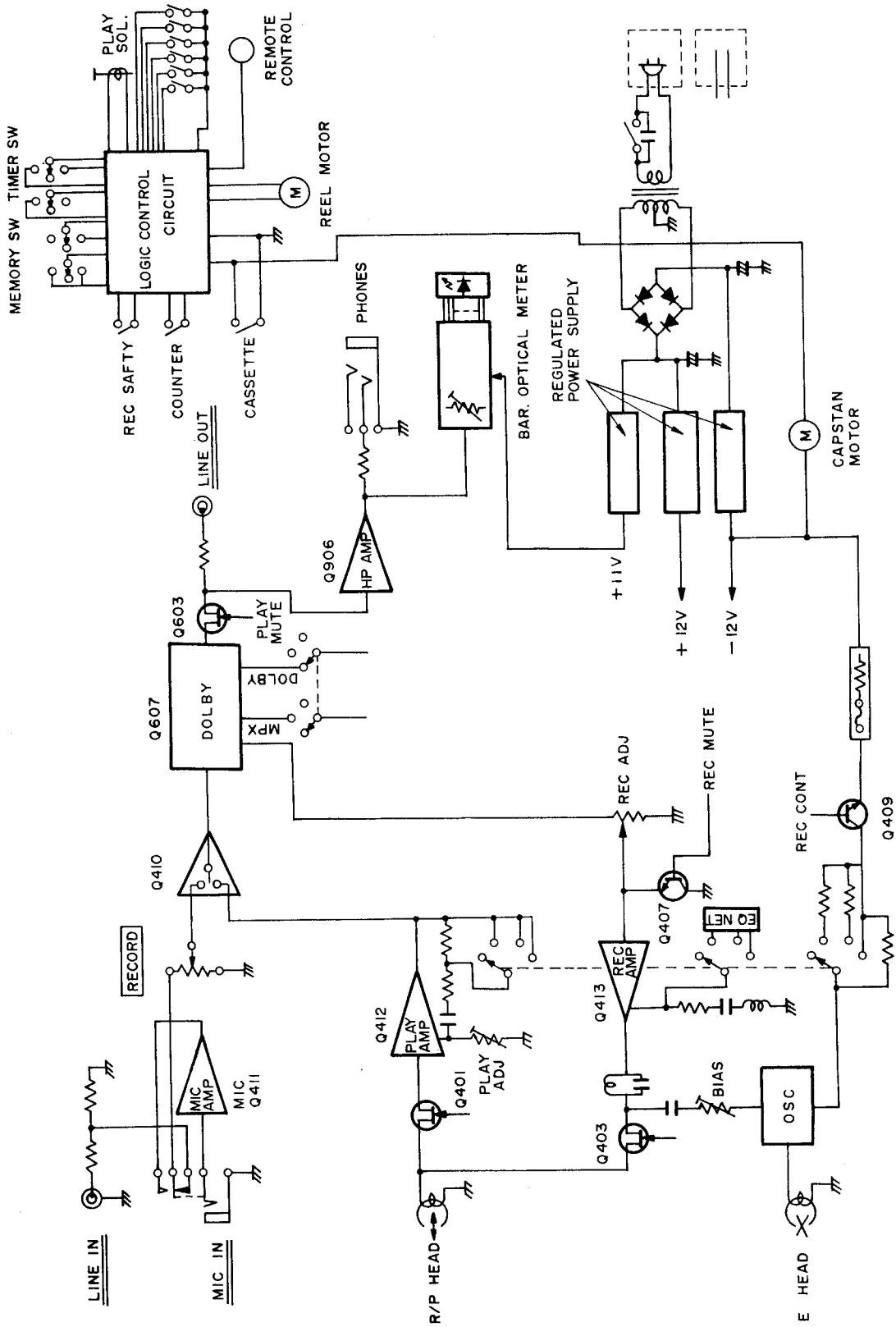
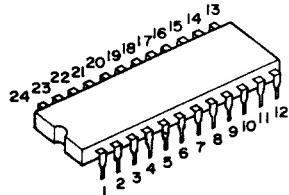


Figure 27

7. IC BLOCK DIAGRAM



TC9121P

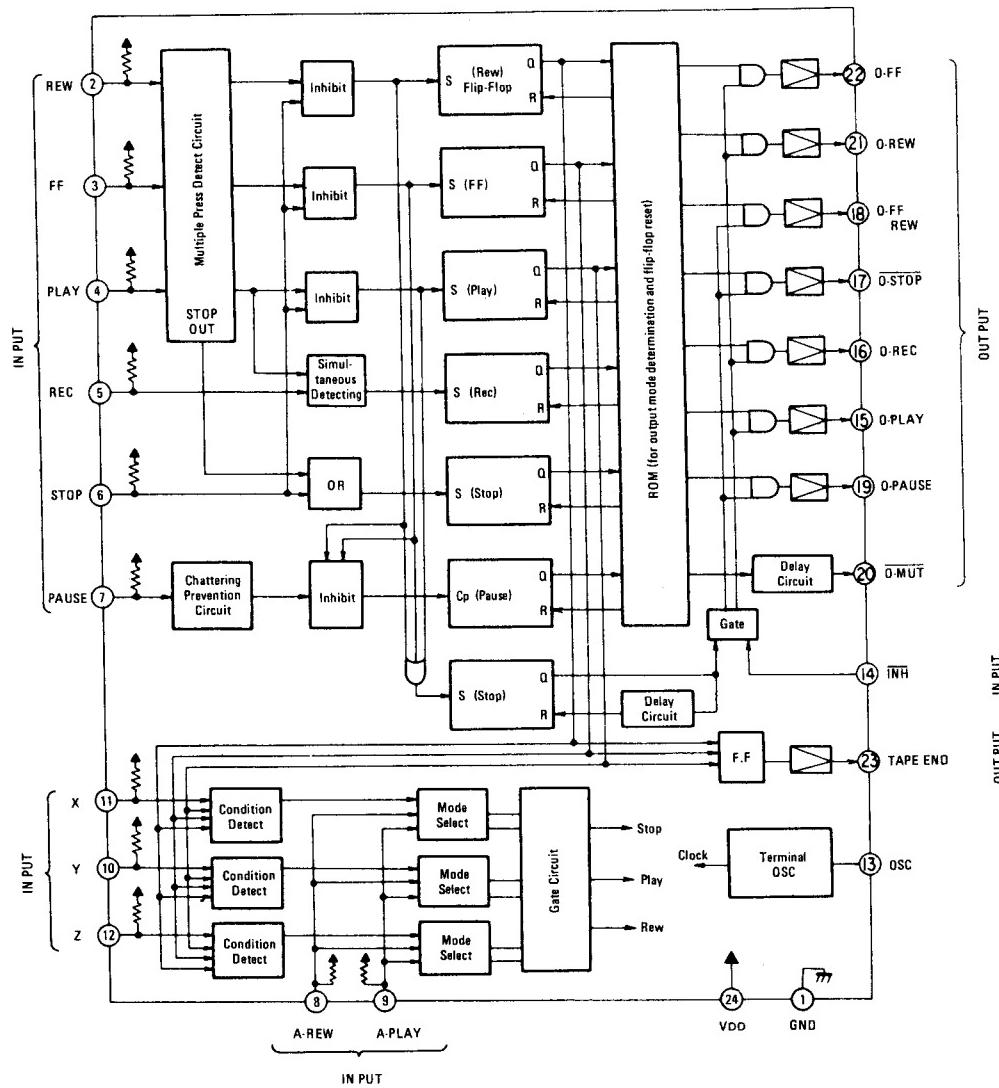
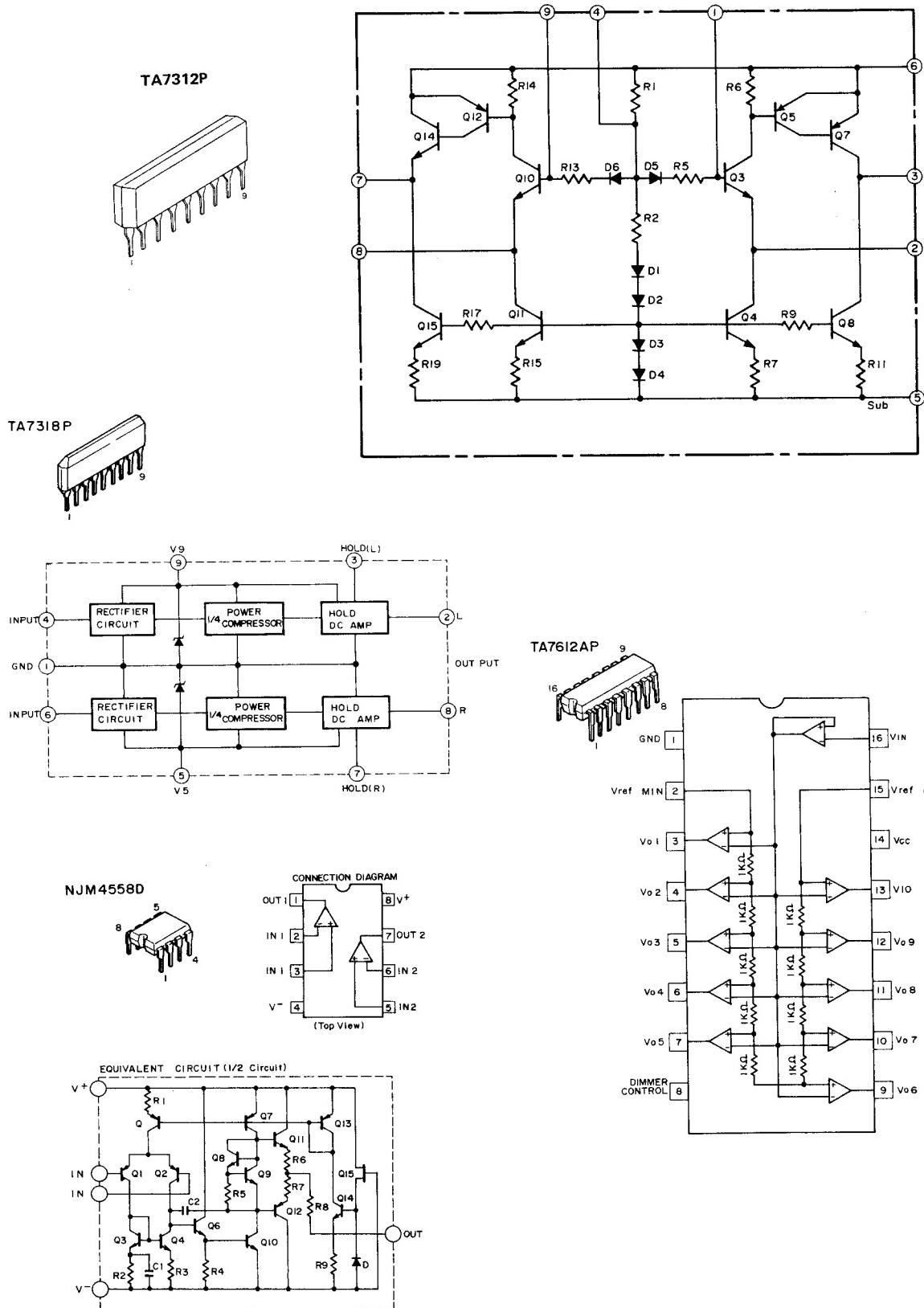


Figure 28



8. ELECTRICAL ADJUSTMENTS

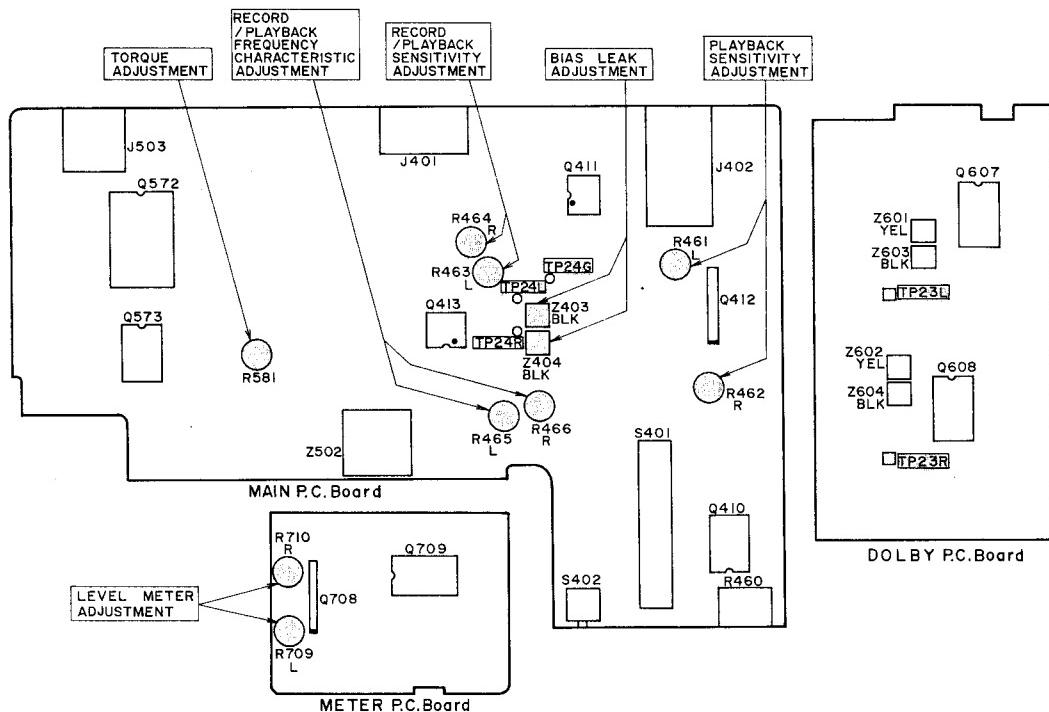


Figure 29

TEST EQUIPMENTS

1. VTVM (Vacuum Tube Voltmeter)
2. Signal Generator
3. Resistance Attenuator
4. Screwdriver

- 5 Test Tapes:
MTT-111 (Speed 3 kHz)
MTT-150 (Dolby 400 Hz Modulation)
MTT-215C (Azimuth 400 Hz/10 kHz)
AC-512 (Chrome Tape)

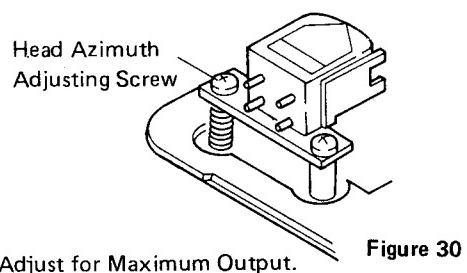


Figure 30

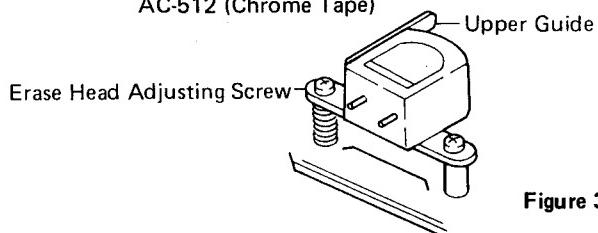


Figure 31

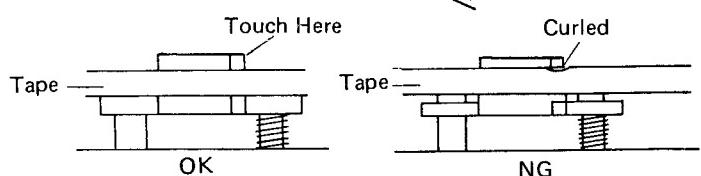


Figure 32

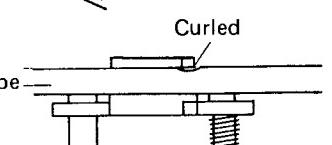


Figure 33

ERASE HEAD HEIGHT ADJUSTMENT

1. Temporally mount the rerase head so that it will be even by eye measurement.
2. Set in PLAY position with setting a mirror cassette tape, MC-09C.
3. Adjust the height adjusting screw so that the upper edge of the tape will touch at the upper tape guide of the erase head. See figure 31.
4. Confirm whether the upper edge of the tape is not Curled.

5. Paint the adjusting screw with lock paint.
P.S. When the mirror cassette is not available, please remodel a normal tape, type C-90 as shown below.
See figure 34.

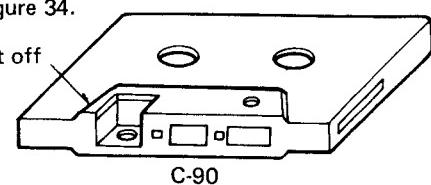


Figure 34

■ ADJUSTMENT PROCEDURES

| No. | Description | Nominal Specs | Test Tape | Volume Control | | Switch Position | | Adjustment Points | Test Points | Test Freq. ATT | Remarks |
|-----|--|----------------------|------------|----------------|------------------|-----------------|----------------------------------|----------------------|-------------------------------|----------------|--|
| | | | | REC | TAPE | DOLBY | | | | | |
| 1 | Head Azimuth Adjustment | MAX. | MTT-111 | | NOR | OUT | Head Azimuth Adjustment Screw | LINE OUT | | | After Adjustment lock with screw point. |
| 2 | Tape Speed Measurement | 3000 ± 30 Hz | MTT-111 | | NOR | OUT | Semi-fixed resistor in the Motor | LINE OUT | | | |
| 3 | Playback Sensitivity Adjustment | 580 ± 10 mV | MTT-150 | | NOR | OUT | R461 R462 | LINE OUT | | | |
| 4 | Playback Frequency Response Measurement (Normal) | +3 dB -5 | MTT-215C | | NOR | OUT | | LINE OUT | | | 10 KHz Level difference for 315 Hz |
| 5 | Playback Frequency Response Measurement (Chrome) | -4 ± 2 dB | MTT-215C | | NOR | OUT | | LINE OUT | | | Change for 10 KHz Normal tape |
| 6 | Output Noise Level | Under 2.5 mV | Blank Tape | | NOR | OUT | | LINE OUT | | | |
| 7 | Bias Leakage Adjustment | MIN. | | | NOR | OUT | Z403 Z404 | T.P. 24L T.P. 24R | | | |
| 8 | Line Input Level Adjustment | 580 ± 10 mV | | Adjustment | CrO ₂ | OUT | REC Volume | LINE OUT | 400 Hz -17 dB | | REC. Volume adjustment must be kept till frequency response adjustment |
| 9 | Meter Adjustment | Meter Ind. +3 dB | | | CrO ₂ | OUT | R709, 710 | LED Meter | 400 Hz -17 dB | | One square (Red LED) lights. |
| | | Meter Indi. -3 dB | | | CrO ₂ | OUT | R709, 710 | LED Meter | 400 Hz -23 dB | | Four squares (Yellow LEDs) light. |
| 10 | Record Playback Frequency Response Adjustment | $0 \frac{+2}{-0}$ dB | AC-512 | | CrO ₂ | OUT | R465 R466 | LINE OUT | 400 Hz to 10 KHz -40 dB | | |
| 11 | Record/Playback Sensitivity Adjustment | 580 ± 10 mV | AC-512 | | CrO ₂ | OUT | R463 R464 | LINE OUT | 400 Hz -17 dB | | |

Measurement Condition

Power Supply TE: 220V/TU, AY: 240V/VF: 115, 230V/TA, TC: 120V
 ● Input: 0 dB = 1V rms ● LINE IN (Input Impedance): 600 ohm ● LINE OUT (Load Impedance): 47 K ohm
 ● Test Point Load Impedance: No Load

(Playback Sensitivity Adjustment

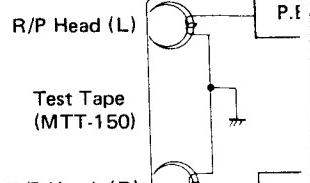


Figure 31

(Bias Leak Adjustment)

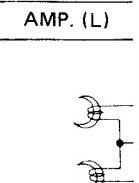


Figure 32

(Line Input Adjustment)

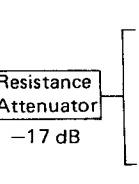


Figure 37

(Rec/Play Sensitivity Adjustment)

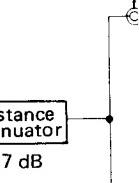


Figure 38

(Rec/Play Frequency Characteri

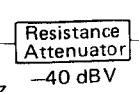


Figure 39

| Test Tape | Volume Control | | Switch Position | | Adjustment Points | Test Points | Test Freq. ATT | Remarks |
|------------|----------------|------------------|-----------------|--------------|----------------------------------|-------------------------------|----------------|--|
| | REC | TAPE | DOLBY | | | | | |
| MTT-111 | | NOR | OUT | | Head Azimuth Adjustment Screw | LINE OUT | | After Adjustment lock with screw point. |
| MTT-111 | | NOR | OUT | | Semi-fixed resistor in the Motor | LINE OUT | | |
| MTT-150 | | NOR | OUT | | R461 R462 | LINE OUT | | |
| MTT-215C | | NOR | OUT | | | LINE OUT | | 10 KHz Level difference for 315 Hz |
| MTT-215C | | NOR | OUT | | | LINE OUT | | Change for 10 KHz Normal tape |
| Blank Tape | | NOR | OUT | | | LINE OUT | | |
| | | NOR | OUT | Z403 Z404 | T.P. 24L T.P. 24R | | | |
| | Adjustment | CrO ₂ | OUT | REC Volume | LINE OUT | 400 Hz -17 dB | | REC. Volume adjustment must be kept till frequency response adjustment |
| | | CrO ₂ | OUT | R709, 710 | LED Meter | 400 Hz -17 dB | | One square (Red LED) lights. |
| | | CrO ₂ | OUT | R709, 710 | LED Meter | 400 Hz -23 dB | | Four squares (Yellow LEDs) light. |
| AC-512 | | CrO ₂ | OUT | R465 R466 | LINE OUT | 400 Hz to 10 KHz -40 dB | | |
| AC-512 | | CrO ₂ | OUT | R463 R464 | LINE OUT | 400 Hz -17 dB | | |

VF: 115, 230V/TA, TC: 120V
 Impedance): 600 ohm • LINE OUT (Load Impedance): 47 K ohm

(Playback Sencitivity Adjustment)

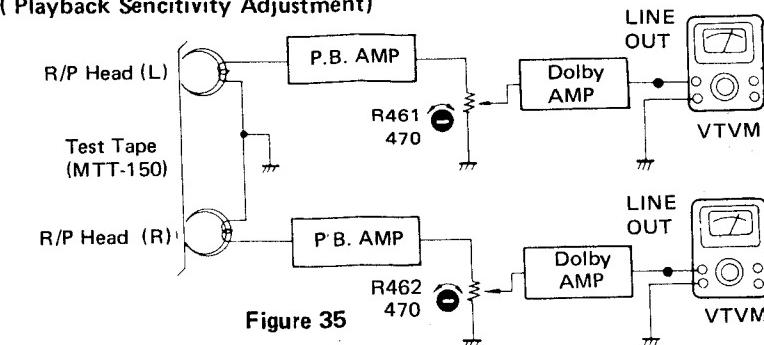


Figure 35

(Bias Leak Adjustment)

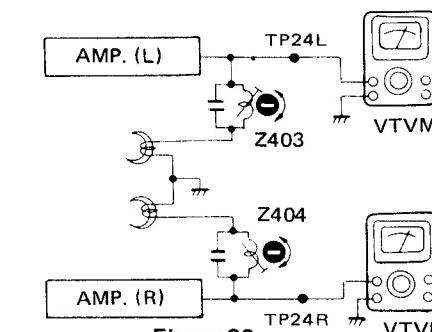


Figure 36

(Line Input Adjustment)

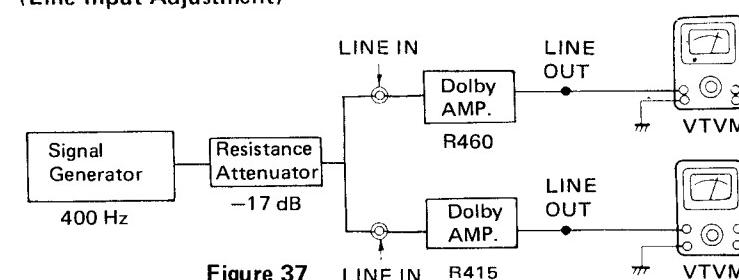


Figure 37

(Rec/Play Sensitivity Adjustment)

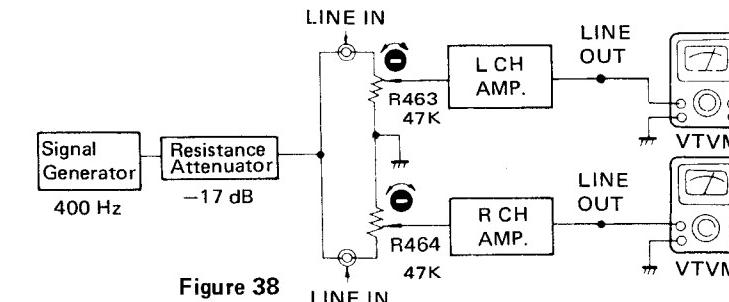


Figure 38

(Rec/Play Frequency Characteristic Adjustment)

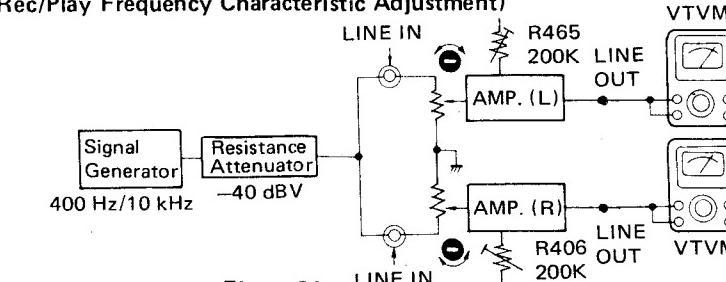


Figure 39

9. P.C BOARD PARTS LOCATIONS

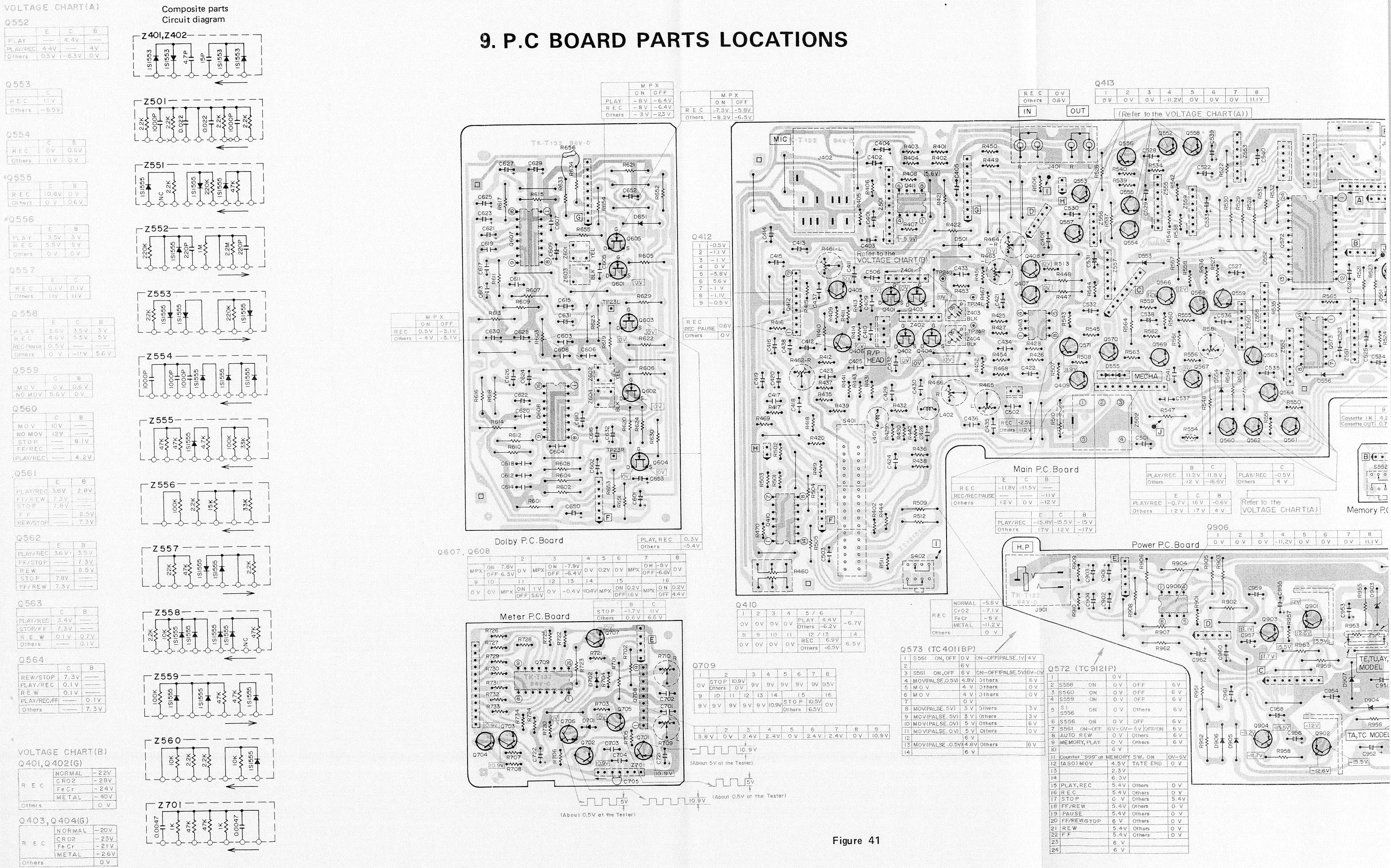


Figure 40

9. P.C BOARD PARTS LOCATIONS

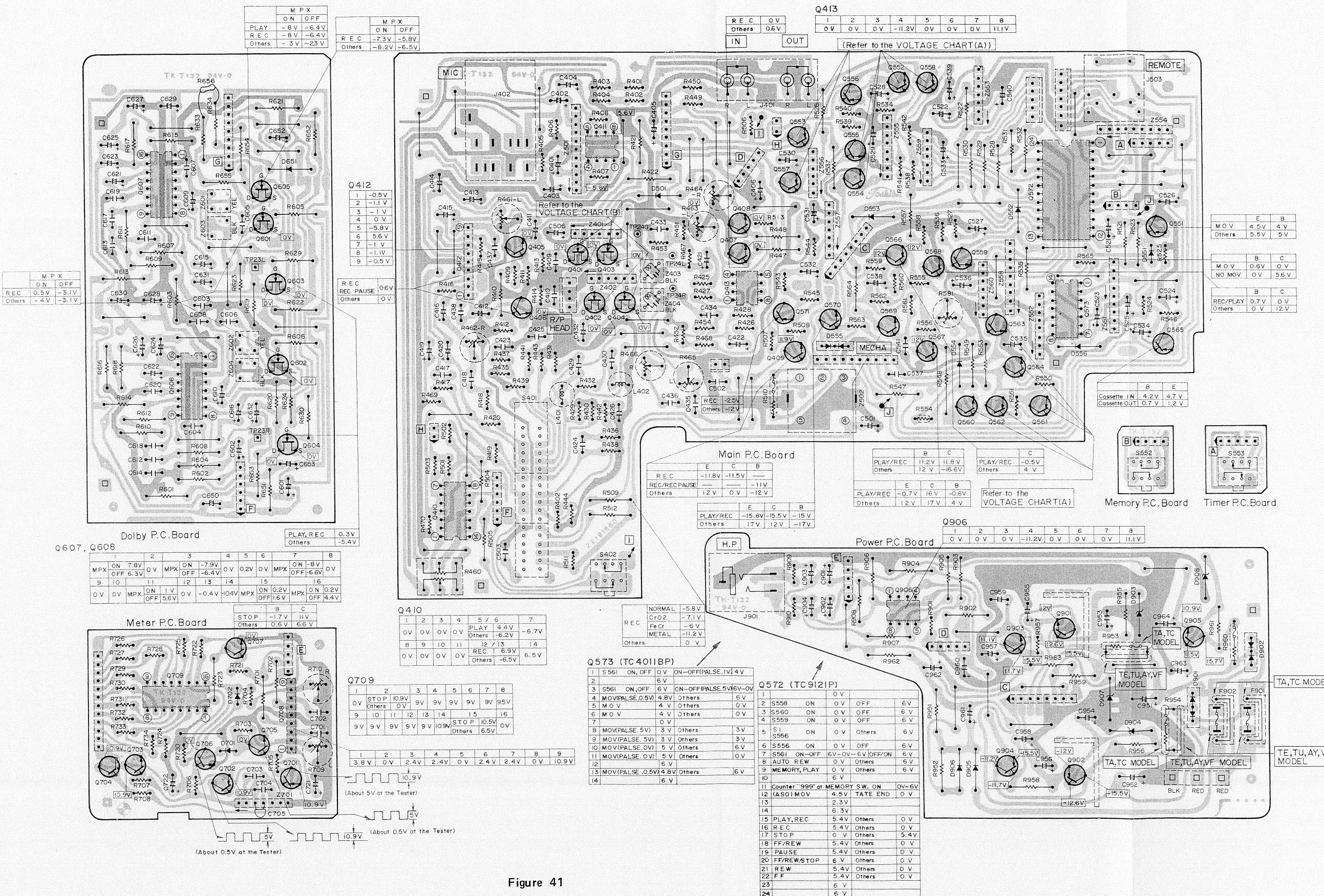
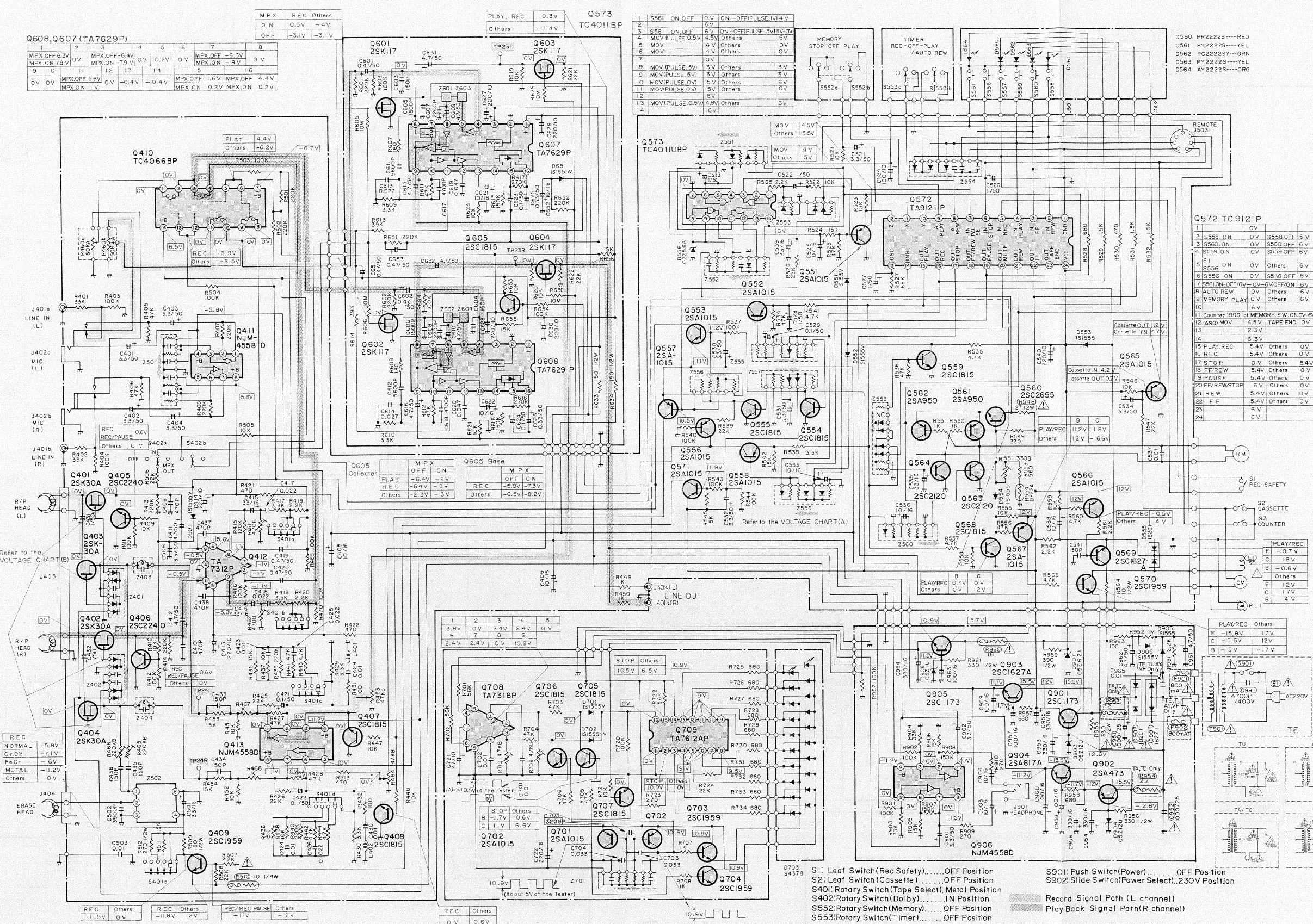


Figure 41

10. SCHEMATIC DIAGRAM

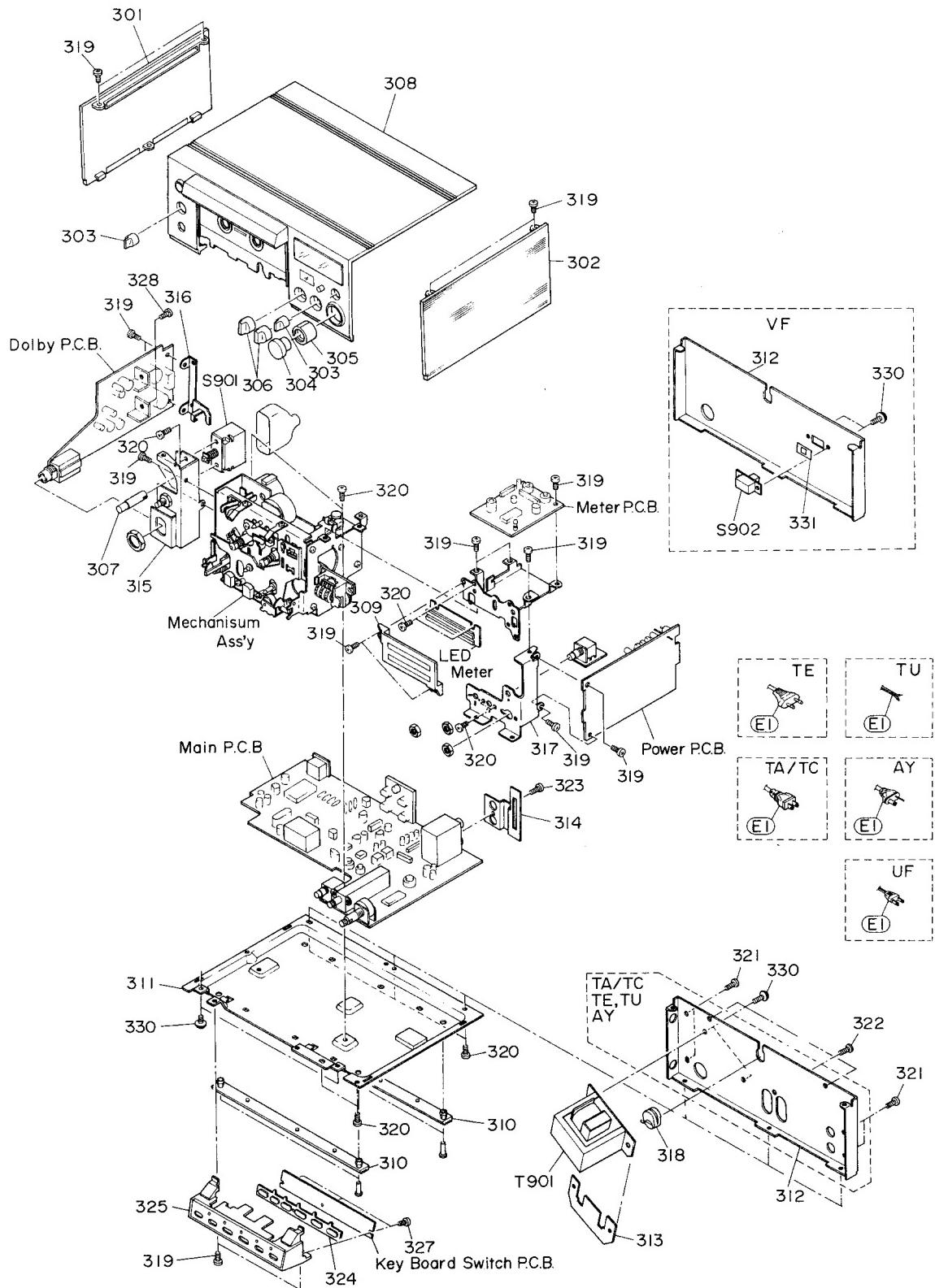


CAUTION:

CAUTION: The  mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

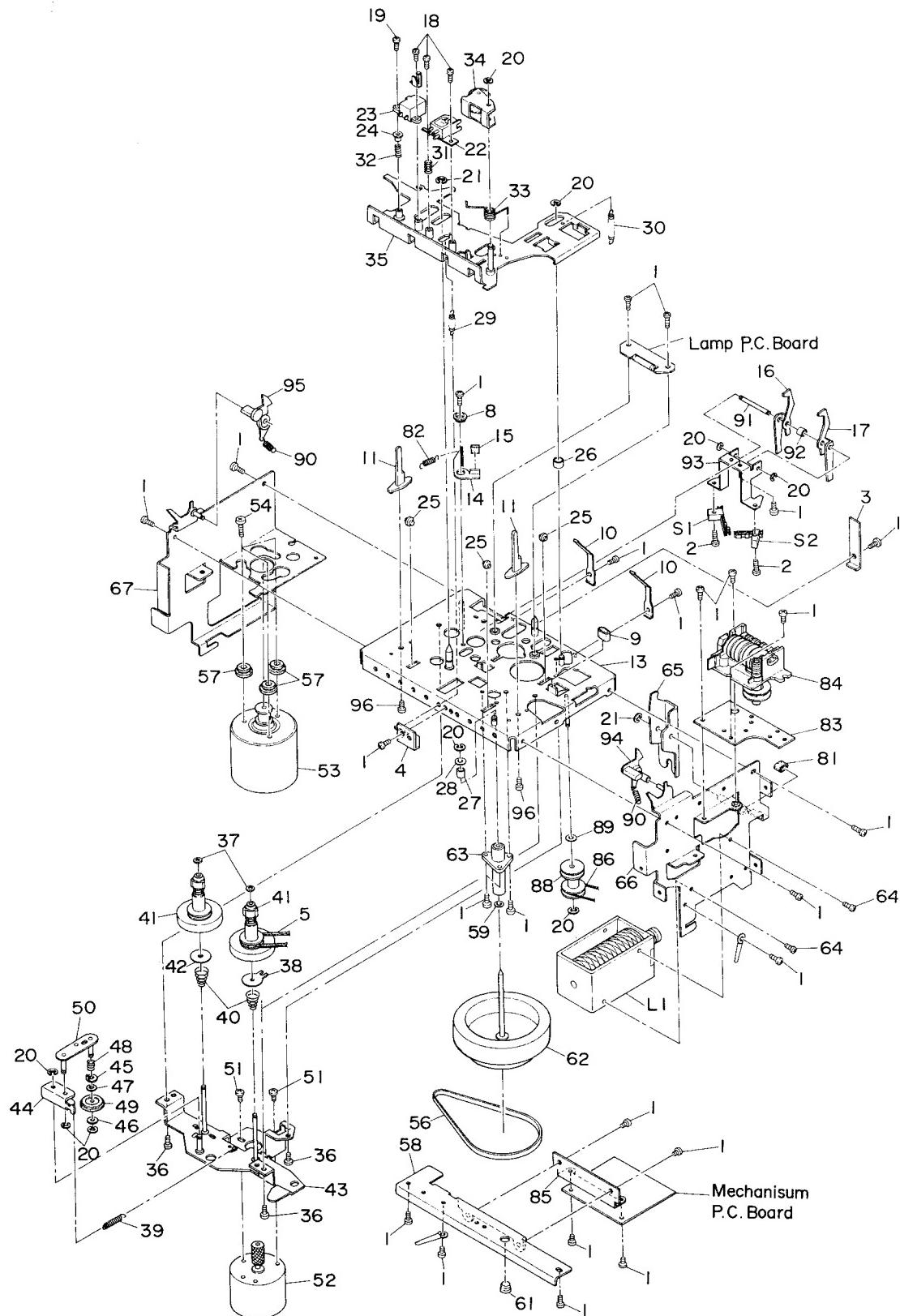
Figure 42

12. EXPLODED VIEW (CABINET)



NOTE: Parts excluded in the Parts List are not available as replacement parts.

13. EXPLODED VIEW (MECHANISM)



14. PARTS LIST

CAUTION:

The  mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

| Symbol No. | Part No. | Description | Symbol No. | Part No. | Description | | | |
|-------------------------|----------|---------------------------|----------------------|----------|------------------------------------|--|--|--|
| MECHANICAL PARTS | | | | | | | | |
| 1 | 22707735 | Screw, DT BID, 2.6φ x 5mm | 57 | 25761238 | Cushion | | | |
| 2 | 22707169 | Screw, BID, 2.6φ x 10mm | 59 | 25764398 | Washer, 2.5φ | | | |
| 5 | 25755398 | Belt, Counter | 61 | 25783219 | Screw, Thrust | | | |
| 8 | 25724420 | Bush | 62 | 25717451 | Flywheel Ass'y | | | |
| 9 | 25761400 | Stopper, Head Chassis | 63 | 25718158 | Holder Ass'y, Capstan | | | |
| 11 | 25783205 | Guide, A | 64 | 22707452 | Screw, BID, 3φ x 6mm | | | |
| 15 | 25762384 | Felt, Fric | 81 | 25761354 | Arm Cushion | | | |
| 18 | 22707451 | Screw, BID, 2φ x 5mm | 82 | 25771898 | Spring | | | |
| 19 | 22707505 | Screw, BID, 2φ x 6mm | 84 | 25873234 | Counter | | | |
| 20 | 22703118 | E Washer, 2φ | 86 | 25755342 | Belt | | | |
| 21 | 22703279 | E Washer, 3φ | 88 | 25756237 | Pulley, Center | | | |
| 22 | 22217357 | Head, R/PB, HRPT-77 | 89 | 22703306 | Washer | | | |
| 23 | 22218223 | Head, Erase, HET-50 | 90 | 25771963 | Spring | | | |
| 24 | 25726489 | Sleeve, Erase Head | 91 | 25724827 | Bush | | | |
| 25 | 25753325 | Roller | 92 | 25724833 | Roller | | | |
| 26 | 25753347 | Roller, H | 94 | 25782257 | Holder, Cassette, Right | | | |
| 27 | 25753348 | Roller, HL | 95 | 25782292 | Holder, Cassette, Left | | | |
| 28 | 25764400 | Washer, 3φ | 96 | 22707461 | Screw, BID Tapping, 2.6φ x 6mm | | | |
| 29 | 25771704 | Spring | CABINET PARTS | | | | | |
| 30 | 25771951 | Spring | 301 | 25829387 | Plate, Side, Left | | | |
| 31 | 25772240 | Spring, Head | 302 | 25829388 | Plate, Side, Right | | | |
| 32 | 25772438 | Spring, Erase Head | 303 | 25837494 | Knob, Select | | | |
| 33 | 25773469 | Spring, Pinch Lever | 304 | 25837513 | Knob, Volume, Left | | | |
| 34 | 25717457 | Roller Ass'y, Pinch | 305 | 25837514 | Knob, Volume, Right | | | |
| 35 | 25791268 | Chassis Ass'y, Head | 306 | 25837515 | Knob, Select | | | |
| 36 | 22707494 | Screw, DT BID, 2.6φ x 4mm | 307 | 25816562 | Knob, Power | | | |
| 37 | 25764549 | Washer, 1.7φ | 308 | 25819460 | Front Panel Ass'y (TA) | | | |
| 38 | 25766019 | Washer, Back Tension | 308 | 25819461 | Front Panel Ass'y (TC) | | | |
| 39 | 25771586 | Spring | 308 | 25819462 | Front Panel Ass'y (TE, TU, AY, VF) | | | |
| 40 | 25772254 | Spring, Back Tension | 309 | 25832456 | Meter Indicator | | | |
| 41 | 25712360 | Reel Drum Ass'y | 310 | 25835408 | Leg | | | |
| 42 | 25764570 | Washer, 2.1φ | 312 | 25838569 | Jack Plate (TA, TC) | | | |
| 43 | 25791269 | Reel Mount Ass'y | 312 | 25838568 | Jack Plate (TE) | | | |
| 45 | 25735246 | Retainer, Spring | 312 | 25838570 | Jack Plate (TU, AY) | | | |
| 46 | 25735252 | Washer, Stopper | 312 | 25838577 | Jack Plate (VF) | | | |
| 47 | 25762401 | Felt, FF | 318 | 25845120 | Bush, Nylon (TA, TC, VF) | | | |
| 48 | 25777041 | Spring, Idler FF | 318 | 25845528 | Bush, Nylon (TE, TU, AY) | | | |
| 49 | 25713543 | Idler Ass'y, FF | 319 | 22707366 | Screw, DT BID, 2.6φ x 6mm | | | |
| 50 | 25791141 | Plate B Ass'y, Idler | 320 | 22707445 | Screw, DT BID, 3φ x 6mm | | | |
| 51 | 22701389 | Screw, BID, 2.6φ x 3mm | 321 | 22707446 | Screw, DT BID, 3φ x 6mm | | | |
| 52 | 22791284 | Motor, Ass'y Reel | 322 | 22701326 | Screw, BID, Tapping, 3φ x 8mm | | | |
| 53 | 25791215 | Motor Ass'y, Main | 323 | 22701482 | Screw, PAN, 3φ x 6mm | | | |
| 54 | 22707429 | Screw, Motor | 324 | 22751190 | Rubber, Point | | | |
| 56 | 25755448 | Belt, Main | 325 | 25819466 | Key Box Ass'y | | | |

| Symbol No. | Part No. | Description | Symbol No. | Part No. | Description |
|------------------------------------|----------|---------------------------------|-------------------------|----------|-----------------------------|
| 327 | 22707651 | Screw, PAN, Tapping, 1.7φ x 4mm | Q708 | | IC, TA7318P-2 |
| 328 | 22701313 | Screw, BID, 3φ x 4mm | Q709 | | IC, TA7612AP |
| 329 | 22707521 | Screw, DT BID, 3φ x 6mm | Q901 | | Transistor, 2SC1173-Y |
| 330 | 22707456 | Screw, FL DT, 3φ x 8mm | Q902 | | Transistor, 2SA473-Y |
| 331 | 22950753 | Label, Voltage (VF) | Q903 | | Transistor, 2SC1627A-Y |
| TRANSISTORS, DIODES AND ICS | | | Q904 | | Transistor, 2SA817A-Y |
| | | | Q905 | | Transistor, 2SC1173-Y |
| | | | Q906 | 22114470 | IC, NJM4558D-A |
| Q401, 402 | | Transistor, 2SK30A-TM-GR-Y | D501 | | Diode, 1S1555V |
| Q403, 404 | | Transistor, 2SC2240NEW-GR | D551, 552 | | Diode, 1S1555V |
| Q405, 406 | | Transistor, 2SC1815NEW-GR | D553, 554 | | |
| Q407, 408 | | Transistor, 2SC1959NEW-Y | D555 | | Diode, 1B2C1 |
| Q409 | | IC, TC4066BP | D556 | | Diode, 0Z5.6A |
| Q410 | | IC, NJM4558D-A | D560 | 22115658 | Diode, PR2222S-RED |
| Q411 | | IC, TA7312P-N, JA | D561 | 22115659 | Diode, PY2222S-YEL |
| Q412 | | NJM4558D-A | D562 | 22115660 | Diode, PG2222SY-GRN |
| Q413 | | | D563 | 22115659 | Diode, PY2222S-YEL |
| Q551 | | Transistor, 2SA1015-GR | D564 | 22115661 | Diode, AY2222S-ORG |
| Q552 | | Transistor, 2SA1015-GR | D651 | | Diode, 1S1555V |
| Q553 | | Transistor, 2SA1015-GR | D701, 702 | | Diode, 1S1555V |
| Q554 | | Transistor, 2SC1815NEW-GR | D703 | | Diode, S4378 |
| Q555 | | Transistor, 2SC1815NEW-GR | △ D901 | | Diode, 1B2Z1 |
| Q556 | | Transistor, 2SA1015-GR | △ D902 | | Diode, 1B2C1 |
| Q557 | | Transistor, 2SA1015-GR | D903, 904 | | Diode, 0Z12U |
| Q558 | | Transistor, 2SA1015-GR | D905 | | Diode, 1S1553V |
| Q559 | | Transistor, 2SC1815NEW-GR | D906 | | Diode, 1S1555V |
| Q560 | | Transistor, 2SC2655-Y-O/Y | D907 | | Diode, 0Z6.2L |
| Q561 | | Transistor, 2SA950-Y | D908 | | Diode, 0Z11U |
| Q562 | | Transistor, 2SA950-Y | ELECTRICAL PARTS | | |
| Q563 | | Transistor, 2SC2120-Y | △ T901 | 22223841 | Transformer, Power (TA, TC) |
| Q564 | | Transistor, 2SC2120-Y | △ T901 | 22223842 | Transformer, Power (TE) |
| Q565 | | Transistor, 2SA1015-GR | △ T901 | 22223843 | Transformer, Power (TU, AY) |
| Q566 | | Transistor, 2SA1015-GR | △ T901 | 22223887 | Transformer, Power (VF) |
| Q567 | | Transistor, 2SA1015-GR | J401 | 22163759 | Jack, US 4P |
| Q568 | | Transistor, 2SC1815NEW-GR | J402 | 22163675 | Jack, Microphone, 6.5φ |
| Q569 | | Transistor, 2SC1627A-Y | J503 | 22167893 | Jack, DIN, Remote Control |
| Q570 | | Transistor, 2SC1959NEW-Y | J901 | 22163777 | Jack, Headphone |
| Q571 | | Transistor, 2SA1015-GR | | | |
| Q572 | | IC, TA9121P | | | |
| Q573 | | IC, TC4011UBP | | | |
| Q601, 602 | | Transistor, 2SK117-BL | | | |
| Q603, 604 | | | | | |
| Q605 | | Transistor, 2SC1815NEW-GR | | | |
| Q607, 608 | | IC, TA7629P | | | |
| Q701, 702 | | Transistor, 2SA1015-GR | | | |
| Q703, 704 | | Transistor, 2SC1959NEW-Y | | | |
| Q705, 706 | | Transistor, 2SC1815NEW-GR | | | |
| Q707 | | | | | |

| Symbol No. | Part No. | Description | Symbol No. | Part No. | Description |
|---|----------|--------------------------------------|-------------|----------|----------------------|
| S1 | 22195199 | Switch, Leaf, Record Safety | C415, 416 | 22485330 | EL, 33mfd, 16V |
| S2 | 22195199 | Switch, Leaf, Cassette | C417, 418 | 22371223 | MY, 0.022mfd, 50V, J |
| S401 | 22195680 | Switch, Rotary, Tape Select | C419, 420 | 22488478 | EL, 0.47mfd, 50V |
| S402 | 22195326 | Switch, Rotary, Dolby | C421, 422 | 22480003 | EL, 0.1mfd, 50V |
| S552 | 22195220 | Switch, Rotary, Memory | C423, 424 | 22371103 | MY, 0.01mfd, 50V, J |
| S553 | 22195220 | Switch, Rotary, Timer | C425, 426 | 22371223 | MY, 0.022mfd, 50V, J |
| △ S901 | 22195226 | Switch, Push, Power (TA, TC) | C429, 430 | 22371103 | MY, 0.01mfd, 50V, J |
| △ S901 | 22195378 | Switch, Push, Power (TE, TU, AY, VF) | C431, 432 | 22488109 | EL, 1mfd, 50V |
| △ S902 | 22146186 | Switch, Slide Power Select (VF) | C433, 434 | 22349151 | CD, 150pF, 50V, K |
| PL1 | 22113484 | Lamp, 50mA/14V | C435, 436 | 22349151 | CD, 150pF, 50V, K |
| △ L1 | 22147227 | Solenoid | C437, 438 | 22349471 | CD, 470pF, 50V, K |
| L401, 402 | 22211264 | Coil, 5.6mH | C501 | 22485330 | EL, 33mfd, 16V |
| △ F901, 902 | 22144387 | Fuse, 800mA(T) (TE, TU, AY, VF) | C502 | 22371392 | MY, 3900pF, 50V, J |
| Z401, 402 | 22130588 | Composite Parts SW A | C503 | 22342103 | CD, 0.01mfd, 50V, Z |
| Z403, 404 | 22153158 | Filter Block | C506 | 22488339 | EL, 3.3mfd, 50V |
| Z501 | 22130593 | Composite Parts, Microphone | C521 | 22488339 | EL, 3.3mfd, 50V |
| Z502 | 22132530 | Unit, Bias OSC | C522 | 22488109 | EL, 1mfd, 50V |
| Z551 | 22130585 | Composite Parts, Logic E | C523 | 22488109 | EL, 1mfd, 50V |
| Z552 | 22130584 | Composite Parts, Logic D | C524 | 22485101 | EL, 100mfd, 10V |
| Z553 | 22130586 | Composite Parts, Logic F | C525 | 22485100 | EL, 10mfd, 16V |
| Z554 | 22130583 | Composite Parts, Logic C | C526 | 22488109 | EL, 1mfd, 50V |
| Z555 | 22130595 | Composite Parts, SW C | C527 | 22488109 | EL, 1mfd, 50V |
| Z556 | 22130591 | Composite Parts, SW D | C528 | 22488109 | EL, 1mfd, 50V |
| Z557 | 22130592 | Composite Parts, SW E | C529 | 22480003 | EL, 0.1mfd, 50V |
| Z558 | 22130580 | Composite Parts, Logic A | C530 | 22488339 | EL, 3.3mfd, 50V |
| Z559 | 22130594 | Composite Parts, SW B | C531 | 22488339 | EL, 3.3mfd, 50V |
| Z560 | 22130582 | Composite Parts, Logic B | C532 | 22488339 | EL, 3.3mfd, 50V |
| Z601, 602 | 22153157 | Filter, Block, Bias | C533 | 22485100 | EL, 10mfd, 16V |
| Z603, 604 | 22153158 | Filter, Block, MPX | C534 | 22488339 | EL, 3.3mfd, 50V |
| △ | 22176573 | Cord, Power (TA, TC) | C535 | 22485330 | EL, 33mfd, 16V |
| △ | 22176286 | Cord, Power (TE) | C536 | 22485100 | EL, 10mfd, 16V |
| △ | 22176536 | Cord, Power (TU) | C537 | 22371103 | MY, 0.01mfd, 50V, J |
| △ | 22176588 | Cord, Power (AY) | C538 | 22485100 | EL, 10mfd, 16V |
| △ | 22176125 | Cord, Power (VF) | C539 | 22485330 | EL, 33mfd, 16V |
| | | | C540 | 22483221 | EL, 220mfd, 10V |
| | | | C541 | 22349151 | CD, 150pF, 50V, K |
| CAPACITORS | | | C701, 702 | 22372103 | MY, 0.01mfd, 50V, J |
| $J = \pm 5\%$, $K = \pm 10\%$, $P = 0 + 100\%$, $Z = -20 + 80\%$ | | | C703, 704 | 22372333 | MY, 0.033mfd, 50V, J |
| ABBREVIATIONS: EL = Electrolytic, CD = Ceramic Disk, MY = Mylar | | | C705 | 22349222 | CD, 2200pF, 50V, K |
| | | | C721 | 22483470 | EL, 47mfd, 10V |
| | | | C722 | 22485221 | EL, 220mfd, 16V |
| | | | C901, 902 | 22488339 | EL, 3.3mfd, 50V |
| | | | C903, 904 | 22485100 | EL, 10mfd, 16V |
| | | | △ C951, 952 | 22486102 | EL, 1000mfd, 25V |
| C401, 402 | 22488339 | EL, 3.3mfd, 50V | | | |
| C403, 404 | 22488339 | EL, 3.3mfd, 50V | | | |
| C405, 406 | 22485100 | EL, 10mfd, 16V | | | |
| C409, 410 | 22349471 | CD, 470pF, 50V, K | | | |
| C411, 412 | 22488479 | EL, 4.7mfd, 50V | | | |
| C413, 414 | 22483221 | EL, 220mfd, 10V | | | |

| Symbol No. | Part No. | Description | Symbol No. | Part No. | Description |
|--|----------|---|------------|-----------------|-----------------|
| C953, 954 | 22485331 | EL, 330mfd, 16V | R501, 502 | 22555224 | 220K ohm |
| C955, 956 | 22485331 | EL, 330mfd, 16V | R503, 504 | 22555104 | 100K ohm |
| C957, 958 | 22485101 | EL, 100mfd, 16V | R505 | 22545103 | 10K ohm |
| C958, 960 | 22485101 | EL, 100mfd, 16V | R506 | 22555223 | 22K ohm |
| C961, 962 | 22488479 | EL, 4.7mfd, 50V | R507 | 22555222 | 2.2K ohm |
| C963 | 22485101 | EL, 100mfd, 16V | R508 | 22555223 | 22K ohm |
| C964 | 22485331 | EL, 330mfd, 16V | R509 | 22547181 | 180 ohm, ½W |
| C965 | 22342103 | CD, 0.01mfd, 50V, Z (TE, TU, AY, VF) | R510 | 22500130 | 10 ohm, Fusible |
| △ C991 | 22340140 | CD, 0.01mfd, 125V, P (TA, TC) | R511 | 22555152 | 1.5K ohm |
| △ C991 | 22340150 | CD, 4700pF, 400V, M (TE, TU, AY, VF) | R512 | 22547271 | 270 ohm, ½W |
| RESISTORS | | | R513 | 22555471 | 470 ohm |
| All resistors are carbon film ½W, ±5%, unless otherwise noted. | | | R521 | 22545103 | 10K ohm |
| R401, 402 | 22555333 | 33K ohm | R522 | 22545103 | 10K ohm |
| R403, 404 | 22555104 | 100K ohm | R523 | 22545103 | 10K ohm |
| R405, 406 | 22555473 | 47K ohm | R524 | 22555153 | 15K ohm |
| R407, 408 | 22555224 | 220K ohm | R525 | 22555473 | 47K ohm |
| R409, 410 | 22555103 | 10K ohm | R526 | 22545223 | 22K ohm |
| R411, 412 | 22555104 | 100K ohm | R527 | 22555683 | 68K ohm |
| R413, 414 | 22555224 | 220K ohm | R528 | 22545681 | 680 ohm |
| R415, 416 | 22555124 | 120K ohm | R529 | 22545152 | 1.5K ohm |
| R417, 418 | 22555332 | 3.3K ohm | R530 | 22545471 | 470 ohm |
| R419, 420 | 22555222 | 2.2K ohm | R531 | 22545152 | 1.5K ohm |
| R421, 422 | 22545471 | 470 ohm | R532 | 22545152 | 1.5K ohm |
| R425, 426 | 22555223 | 22K ohm | R534 | 22555473 | 47K ohm |
| R427, 428 | 22555472 | 4.7K ohm | R535 | 22555472 | 4.7K ohm |
| R429, 430 | 22555332 | 3.3K ohm | R536 | 22555473 | 47K ohm |
| R431, 432 | 22555101 | 100 ohm | R537 | 22545104 | 100K ohm |
| R435, 436 | 22555153 | 15K ohm | R538 | 22555332 | 3.3K ohm |
| R437, 438 | 22555103 | 10K ohm | R539 | 22555223 | 22K ohm |
| R439, 440 | 22555224 | 220K ohm | R540 | 22555104 | 100K ohm |
| R441, 442 | 22555472 | 4.7K ohm | R541 | 22555472 | 4.7K ohm |
| R443, 444 | 22555472 | 4.7K ohm | R542 | 22555153 | 15K ohm |
| R447, 448 | 22545103 | 10K ohm | R543 | 22555104 | 100K ohm |
| R449, 450 | 22555102 | 1K ohm | R544 | 22555104 | 100K ohm |
| R451, 452 | 22555103 | 10K ohm | R545 | 22555153 | 15K ohm |
| R453, 454 | 22555153 | 15K ohm | R546 | 22555103 | 10K ohm |
| R460 | 22655432 | 50K ohm, A, Variable | R547 | 22545223 | 22K ohm |
| R461, 462 | 22658556 | 470 ohm, B, Semi-fixed | △ R548 | 22570300 | 27 ohm, 2W |
| R463, 464 | 22658560 | 47K ohm, B, Semi-fixed | R549 | 22545330 | 330 ohm |
| R465, 466 | 22658560 | 47K ohm, B, Semi-fixed | R550 | 22555102 | 1K ohm |
| R467, 468 | 22555102 | 1K ohm | R551 | 22555102 | 1K ohm |
| R469, 470 | 22555104 | 100K ohm | R553 | 22545561 | 560 ohm |
| | | | R554 | Termister, D22A | |
| | | | R555 | 22555103 | 10K ohm |
| | | | R556 | 22555473 | 47K ohm |
| | | | R557 | 22545472 | 4.7K ohm |
| | | | R558 | 22555103 | 10K ohm |
| | | | R559 | 22555103 | 10K ohm |
| | | | R560 | 22555472 | 4.7K ohm |
| | | | R561 | 22555222 | 2.2K ohm |
| | | | R562 | 22555222 | 2.2K ohm |

| Symbol No. | Part No. | Description | Symbol No. | Part No. | Description |
|------------|----------|-------------------------|--------------------|----------|-----------------------------|
| R563 | 22555472 | 4.7K ohm | R951 | 22545222 | 2.2K ohm |
| R564 | 22547100 | 10 ohm, ½W | R952 | 22545105 | 1M ohm |
| R565 | 22555222 | 2.2K ohm | R953, 954 | 22500167 | 2.2 ohm, Fusible (TA, TC) |
| R581 | 22658555 | 330 ohm, B, Semi-fixed | R955, 956 | 22547331 | 330 ohm, ½W |
| R601, 602 | 22545224 | 220K ohm | R957, 958 | 22555681 | 680 ohm |
| R603, 604 | 22545104 | 100K ohm | R959 | 22547391 | 390 ohm, ½W |
| R605, 606 | 22545105 | 10M ohm | R960 | 22500130 | 10 ohm, Fusible |
| R607, 608 | 22545181 | 180 ohm | R961 | 22547331 | 330 ohm, ½W |
| R609, 610 | 22545332 | 3.3K ohm | R962 | 22545104 | 100K ohm |
| R611, 612 | 22545473 | 47K ohm | R963 | 22545101 | 100 ohm |
| R613, 614 | 22545393 | 39K ohm | ACCESSORIES | | |
| R615, 616 | 22545154 | 150K ohm | | 22164775 | Cord, Joint |
| R617, 618 | 22545274 | 270K ohm | | 22881047 | Cover, Dust |
| R619, 620 | 22545103 | 10K ohm | | 22990756 | Cleaner, Head |
| R621, 622 | 22545223 | 22K ohm | | 22902842 | Owner's Manual (TA, TC) |
| R623, 624 | 22545103 | 10K ohm | | 22902843 | Owner's Manual (TE, TU, AY) |
| R629, 630 | 22545105 | 10M ohm | | 22902845 | Owner's Manual (VF) |
| R633, 634 | 22547151 | 150 ohm, ½W | | | |
| R651 | 22545224 | 220K ohm | | | |
| R652 | 22545224 | 220K ohm | | | |
| R653 | 22545103 | 10K ohm | | | |
| R654 | 22545104 | 100K ohm | | | |
| R655 | 22545153 | 15K ohm | | | |
| R656 | 22545152 | 1.5K ohm | | | |
| R701, 702 | 22545563 | 56K ohm | | | |
| R703, 704 | 22555473 | 47K ohm | | | |
| R705, 706 | 22555473 | 47K ohm | | | |
| R707, 708 | 22555102 | 1K ohm | | | |
| R709, 710 | 22658558 | 4.7K ohm, B, Semi-fixed | | | |
| R720 | 22555104 | 100K ohm | | | |
| R721 | 22555103 | 10K ohm | | | |
| R722 | 22555563 | 56K ohm | | | |
| R723 | 22545271 | 270 ohm | | | |
| R724 | 22555223 | 22K ohm | | | |
| R725, 726 | 22555681 | 680 ohm | | | |
| R727, 728 | 22555681 | 680 ohm | | | |
| R729, 730 | | | | | |
| R731, 732 | | | | | |
| R733, 734 | | | | | |
| R901, 902 | 22545104 | 100K ohm | | | |
| R903, 904 | 22555333 | 33K ohm | | | |
| R905, 906 | 22545153 | 15K ohm | | | |
| R907, 908 | 22545154 | 150K ohm | | | |
| R909, 910 | 22555271 | 270 ohm | | | |